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PHYSIOGNOMY

UPON

SCIENTIFIC PRINCIPLES.

ORIGINALLY DELIVERED

IN A SERIES OF LECTURES.

BY

JOHN CROSS, M.D.

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TO

DR. MATTHEW BAILLIE,

F. R. S. L. & E.

PHYSICIAN EXTRAORDINARY TO THE KING,

&c. &c. &c.

THIS BOOK

IS MOST RESPECTFULLY DEDICATED,

BY

THE AUTHOR.

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INTRODUCTORY REMARKS.

Although much has been written, and much more spoken on the subject of physiognomy, and although all men, in their intercourse with one another, are practical physiognomists, yet a fair commencement has scarcely been given to this interesting science. That a science so interesting and so useful should have lagged so far behind, can scarcely be attributed to that prohibitory statute, Geo. II. c. 5. 1741, which denounces "all persons," "pretending to have skill in physiognomy, palmistry, or like crafty science," to be "rogues and vagabonds," and as such to be liable to punishment (Hutch. Just. Peace, vol. 4th, page 157th.); for able philosophers have not been deterred from the investigation, but by their failure have done what the statute could not do,—have thrown a discouragement in the way of others, and a halo of suspicion around the science itself, as if

it were either a phantom of the imagination, or a knavish fraud, requiring the enactment of such a statute. The real cause of failure lies in the mode of investigation.

Physiognomy has been hitherto studied and investigated as a distinct independent science, as if Nature had given all the endless variety of size, shape and colour, to the innumerable individuals of the animated world, for the sole purpose of letting them all into the knowledge of each other's character; whereas not one organ in the whole body has been constructed peculiarly for a physiognomical purpose. The aim of Nature has been to create an animal; and all the parts of the body have been constituted primarily for animal purposes, and only secondarily for physiognomical. The human mind is just a part, and the grandest part of improved animality; hence mental qualities can be indicated only through the medium of animal functions. The brain is an animal as well as an intellectual organ; indeed it is an intellectual, that it may be a better animal, organ; and conversely, it is an animal organ, that it may be

a better intellectual: the parts subservient to the brain, therefore, are not subjected to distinct physiognomical laws, but obey the same laws at once in their animal and physiognomical capacities. Every organ is physiognomically good in proportion to its aptitude for performing its function in the animal economy; and the whole assemblage of organs, in other words, the animal is physiognomically good in proportion to its aptitude for performing the whole vital and animal functions. It is in virtue of possessing by far the most complete system of organs that man stands so pre-eminent above the rest of the animated world; and it is in virtue of possessing superior organs that a man is enabled to surpass his fellows. All living beings, in the great run of things, have their rank in the scale of life, on the same level of elevation with their physiognomical beauty; indeed the correct associations, out of which true beauty arises, constitute the science of physiognomy. The animal machinery is too complicated, its parts are too intimately connected, and too closely and mutually dependent on each other, and its operations are too silent and invisible, to be scanned by

a glance. If the physiologist, with all the animate and inanimate world before him, as objects and instruments of observation and experiment, is yet involved in the midst of inextricable perplexity, and necessitated to cut asunder one Gordian knot after another, with the never-failing sword of dogmatism; need we wonder that the physiognomist, with all his calculations and measurements upon the surface, should fail to divine what was doing, and what could be done within,—should present nothing at this day but a jumble of loose gratuitous assertions, without a single principle to support them, and often, without even speciousness to recommend? Dogmatism on the one hand, and credulity on the other, are necessary to buoy up the mind with imaginary knowledge until enow of facts are acquired. To those vague hypotheses and opinions which we now hold in so much derision, have we been indebted for the first facts in almost all sciences, and for keeping up the human intellect, which, when entangled in a dilemma, cannot proceed, and could never have got out of the dilemma without proceeding. So intimately are

all the parts of the body linked together, that they cannot, without violence, be separated, even after death, by the scalpel of the anatomist;—scarcely can ideal divisions be made without disjoining parts that would have better remained together: but so small is the range of our comprehensive faculties, that, like the hungry child when presented with a whole quartern loaf, they would be appalled and confounded with the whole body placed before them at once. It is more from the limited nature of our comprehension, than from the weakness of our intellectual powers, that we cannot study physiology and physiognomy in the lump,—that we cannot see all the parts of the body entering into the formation of one single indivisible organ, performing one single indivisible function, and that we cannot see at once, from the appearance of this organ, how well it is calculated to perform its function. In order to accommodate the subject to our contemplative faculties, we must take down the whole vital and animal machinery into its constituent parts, and having examined every part not only by itself, but also in relation to all

the others, and found out the separate use and meaning of each, we must again put them all together into one machine. While, however, we have a part amputated in imagination from the body, let us hold the part up in its natural attitude, and keep in remembrance that the part grew along with the rest of the body, and was supported by the same vitality, and that the separation is a violation of nature for our own accommodation. In this division of our subject, we must lift off one piece after another with the cautious delicate hand of the physiologist, not with the rude violent hand of the anatomist; we must be careful that we make our separations where the natural junctions are weakest. To divide and arrange the body into organs, and to ascribe to each its function, is physiology. To view all these organs in connexion, and to compute the influence of each, and the concentrated influence of the whole, in determining the great movements of the individual among other individuals, all acting their respective parts in the great struggle and bustle of life, is physiognomy. Physiognomy is just a

system of corollaries arising out of physiology. Wherever there is life, the science of physiology may set to work; but it is not until vitality begins to be covered with voluntary organs, that physiognomy can commence. Whereever there is life, therefore, there is work for physiology, and work preparing for physiognomy; and does not the whole creation teem with life? From crystallization and chemical affinity, up to the high and complicated functions of the human body, we have one uninterrupted gradation of life. From the most primitive granite up to man, we meet with no line of discrimination. In tracing up the mineral kingdom, we find ourselves, before we are aware, among the lichens; and ere we have gained the summit of the vegetable kingdom, we perceive the very roots in motion, and that the skin has become tender and shy to the touch. We have now got among the zoophites. No wonder philosophers have experienced difficulty in establishing distinctions into natural kingdoms, which have risen from the false glimmerings of a short-sighted intellect through the dense vapours of ignorance. Classification,

which constitutes absolutely no part of science, but is indispensable to its acquirement in the present limited state of our faculties, has, like the most of good things, been carried to an extreme; and, with a blind zeal unworthy of the times, has, instead of being allowed to remain the humble assistant of the memory, been made to usurp the place of science itself. The scaffold which was necessary to the rearing of the ashler work, still overtops the highest turret of the temple itself. The fruitless attempts towards a perfect classification have, however, tended to increase our observations; while the very ultimate failure of such attempts, is a kind of negative proof that all created beings run into each other in one universal, though complicated, gradation. Sitting as passengers in our little barks,—rowing along the narrow currents and eddies of common life, we labour under the optical delusion that every thing is moving backwards; but when we hoist the sails of philosophy, and launch forth into the wide ocean of time, where fleeting ages, and centuries, and epochs, are gliding along in full sail, then can we discern the progressive motion

of Nature ;—then can we see life gradually rising from its rudest beginning; minerals gradually spreading out into vegetables; vegetables, as if tired of their fixture, packing up to travel forth under the character of animals; the immense system of living beings, moving onward towards perfection with various and varying speed, like one vast host, with man at their head.

Physiology, therefore, embraces within its sweep the whole material world, so that chemistry is nothing else than the physiology of mineral life. But physiognomy is limited to the animal creation—to those beings that have a nervous system, and that can perform voluntary action, whether at the instigation of feeling, or instinct, or design. Whether a certain assemblage and arrangement of matter are sufficient to produce motion, and feeling, and thinking, or whether a pure ethereal, or electrical, or galvanical, or magnetical, or a still purer immaterial something be requisite to account for the phenomena, belong not to the physiognomist, but must be left to metaphysicians.

There is as much unity in the body as there can possibly be in the mind. Darwin may be correct in his fanciful supposition, that every bud is a separate individual, and that a tree is a vegetable community. Such a supposition with regard to an inactive tree is even fanciful enough; but to suppose each of the different organs of the body, or each of the different faculties of the mind, for a moment independent of all the rest, is at once to lose all correct idea of either body or mind. But although the whole animal kingdom thus falls within the range of physiognomy, yet man, as incomparably the most powerful and the most intellectual being in this lower world, is the main and proper object of this science. The lower animals, however, taken as a whole, constitute a rough field of physiognomical inquiry, calculated to promote the science in its more refined and dignified application to the human race.

As the fertility of land may, even in the present stage of agriculture, be so far computed from the colour, texture, and composition of the mold, but may be completely ascertained

from the produce; so the fertility of the mind may, even in this incipient stage of physiognomy, be so far computed from the colour, size, and configuration of the body, but may be fully ascertained from the mental produce, if that produce, from out of all its deductions and all its allowances, could be cast up. But as the human mind has such an endless variety of scope; as the closeness of human society tends to give an artificial assimilation of character to all the individuals; as the human race are so expertly imitative in their nature, that it is difficult to find out where originality resides; and as human life is so much made up of manœuvring and deceit; so any estimate of a human being from the manifestations of his mind must be at the best uncertain. But this knowledge of human character, deduced from what of the man's life can be observed, would, even although correct, come too late for useful purposes. It is rather too tardy, and too expensive knowledge, to have found out a man's disingenuity after you have been cheated; to have found out that another was covetous after he had made your property his own; or that a third was

murderous after he had inflicted upon you the mortal stab. It seems to have been mainly to supply this want of promptitude in ascertaining character, that the animal structure has been subjected to physiognomical laws; and especially, that the vicious passions and dispositions have been stamped on the whole surface, and especially on the more ostensible part, the face, with so strong and so indelible impressions. A man may be engendering the vilest designs within, while he is holding forth nice coloured pictures of morality to the world. Here, indeed, any man possessed of a moderate experience of human nature, might venture to entertain suspicions, upon the ground that virtue seldom puts up with ostentation, and that truth neither needs nor seeks an advocate. But it lies with physiognomy to detect the impostor; for however well he may manage to jabber about morality, honour, or even religion, yet he cannot hinder the muscles without from obeying the central impulse; nor can he prevent an organ, whose function is perverted, from falling, according to the self-accommodating power implanted in the human frame, into colour, size,

and shape, most suitable to the performance of this perverted function. It is notorious, and here worthy of remark, that although all good men do not support, or perhaps believe physiognomy, yet the most of bad men are its declared opponents; just as they would oppose a man, and endeavour to throw his testimony into discredit, who had witnessed their vices and their crimes. Every person is more or less loath to acknowledge ignorance. It is even by no means uncommon to hear a man combat a fact or a most palpable truth, evidently for no other reason than that he had been unacquainted with it, and wished to give his ignorance the colour of mere incredulity; so it is with many of the opponents of our science—they admit the truth of this and of the other physiognomical sign, but condemn all the rest as downright nonsense; they, in short, admit all that they know, and deny all that they do not know. Physiognomy, if it is true in a single point, must be true throughout, for every animal is possessed of but one centre and one circumference. If you allow the face of a negro to express less intelligence than the face of a Lord President

Blair, then you have granted the truth of physiognomy; and if you allow the face of a tiger or of a hyena to express more rage and less complacency than the face of a lamb, then you have granted the truth of pathognomy,—the physiognomy of the passions. All your scepticism about the rest must go to the left side of your own account current of observation and discernment. As there would be no anomaly in nature to one that could comprehend the whole, so there can be no exception in the whole extent of physiognomy. That into the science of physiognomy many errors have crept, is an objection from which the most exalted sciences on earth are not to this day exempt. Upon what is dissimulation itself founded, that illusion which throws an apparent ambiguity over the human physiognomy, but upon the truth of that very science which this very dissimulation tends and strives to pervert and to elude?

But the mere truth of a science is by no means a sufficient recommendation. *Cui bono* ought ever to be our motto in all our labours and researches; and it is worthy of observation,

that there is no field of human labour or research, however unpromising, that is incapable, when properly cultivated, of raising a useful crop,—there is no human knowledge that is altogether destitute of that great and only sterling quality—utility. The utility of physiognomy might be spun out into a tedious unprofitable detail, or frittered down into a multifarious and almost evanescent enumeration. Suffice it to mention, that the main drift of this science is to develop character—to enable us to know with whom we are dealing. This is the immediate usefulness. Physiognomy, however, does not stop here, but indulges in a prospect, not very remote, and no less magnificent than of ameliorating the moral condition of the human race. Religion, moral education, and the civil law, have done much toward the happiness and improvement of mankind. Still vicé stalks about; and too often, in the garb and attitude of virtue, insinuates itself into society, while the present physiognomical darkness, like the darkness of the night, is favourable to the imposture. As the light of the sun drives thieves, and robbers, and murderers to their hiding places, so

the day of physiognomy is dawning which must gradually frighten away vice from amongst mankind, and thus co-operate with ethics and religion in finishing up that great work in which they have been labouring so indefatigably for so many centuries.

THE VITAL FUNCTIONS.

The human body, when viewed on the large scale, appears a large bag enclosing a number of organs. The bag itself, the four limbs proceeding from its four corners, and the neck, face, and head, rising up and towering over the whole, are chiefly animal or voluntary organs; whereas the contents are chiefly vital or involuntary. On tracing the various organs, from the human downwards through the descending scale of living beings, we lose one organ after another, until at last we come to three vital fundamental organs, which are capable of maintaining and transmitting life; and on making a further exclusion of what is not immediately essential to life, we are reduced to two fundamental organs, respiratory

and alimentary, which are sufficient for maintaining individual life. Life, therefore, is maintained by the conjoint operation of these two organs, and is more exalted in proportion to their complexity of structure and degree of function. In the 26th and 30th Numbers of the Annals of Philosophy, where this theory of the vital organs is broached, I have stated that there are thrown out of the human lungs, by ordinary respiration, in twenty-four hours, about 40,000 cubic inches of carbonic acid, consisting of no less than about three-quarters of a pound avoirdupois of solid carbon, in chemical combination with the oxygen of the inhaled air; and have shown that the food is the only source from whence this supply of carbon can be derived; and have thence concluded that the main purpose of the alimentary functions, in the animal economy, is to supply carbon to respiration. An advocate for the old doctrine has no room to stand up and maintain that still respiration may merely serve to purify the blood; for that very carbon, of which the blood is partly deprived by respiration, is the main ingredient of the food as it enters the stomach in morsels,

or as it is poured into the blood in the shape of chyle; nay, the main ingredient of the blood itself, and of the whole body is carbon,—indeed the human body might be charred like a piece of wood or coal, so as to retain its original figure. To make the lungs, therefore, a mere purifier of the blood, is to make Nature throw a noxious ingredient into the body, for the sole purpose of putting animals to the toil of breathing out the poison,—is to make our life hang upon the mere removal of small portions of the substance of the body, as so many sacrifices for obtaining present life, as if sacrifice was the tenure by which we were doomed to hold temporal as well as spiritual life,—is to make our stomachs and our lungs wage perpetual war with each other,—is to make our food, which we consider our sustenance, toward which all our best efforts are directed, to be our bane. If respiration, in drawing carbon from the blood, may with propriety be styled a purifier of the blood, then we ought to desist from eating; in which case, if the theory be correct, respiration ought forthwith to cease, while life continues unabated or improved. But we do not find that

starvation improves either the body or the mind, or that respiration gives up till the last moment. Where, indeed, the experiment has been carried too far, as in the case of the horse which was brought to live on a straw in the day, respiration does cease, but with it ceases life. The shipwrecked mariner, tossed on a boisterous ocean, and deprived of food, decays and languishes, notwithstanding that he breathes the purest, and of course the most purifying air in the whole atmosphere; yet, if he does not become famished by cold, he continues to breathe just till all the carbon that can be spared from the body has been expended upon respiration. As the candlewick continues to burn in the socket as long as tallow or wax remains, so respiration holds out till it has consumed all the carbonic materials that can be spared from every part of the body. This is purification with a vengeance. But further, if respiration be a mere purifying process, then after a long foot race, during which circulation and respiration are many times accelerated, the runner ought to put up for a long time with little or no breathing; but we actually find that the poor fellow

gasps for breath long after the race is over, and that after he is quite recruited from his exhaustion, respiration goes on about the same rate as before the race. In short, every circumstance regarding respiration demonstrates its mighty and indispensable utility in the animal economy. Let us then keep in view that this never-ceasing supply of alimentary materials is indispensable to the support of life, as fuel is indispensable to the support of fire. Nor must we suppose that the continual supply of carbon to respiration is at all diminishing the stock of carbon in nature. The carbonic acid gas which we expire, falls, in virtue of its specific gravity, to the ground, and thence is absorbed by vegetables, to be by them and their devourers again expired in gas. The materials of nature never decay, but merely perform revolutions or circles, of which we are yet unable to perceive more than the smallest segments. Indeed Natural History teaches us, that the quantity of carbon in the earth has been gradually increasing. In the immense and numerous strata of coal, we may perceive stores of food hoarded up for times of greater demand; and in our coalworks

and fires we may see Nature fulfilling her own design of circulating, through the medium of our conveniency, her stores of carbon for the purpose of increasing the sum of life. Philosophers were long vainly engaged in endeavouring to convert the baser metals into gold, little aware that its charm and value would have disappeared with the abundance, and that, had their experiments succeeded, the world would have lost their iron and their steel, and, in their stead, have been encumbered with a dazzling but useless metal; but while philosophers were thus idly busied, Nature was performing a grander transmutation before their eyes,—was converting the rock into diamond, not indeed into the dazzling inert chrystal, but into carbonic materials fit for respiration.

The alimentary canal is retained by nature in her own management, or that of her vicegerent ganglia, while both extremities are placed under the jurisdiction of the will. An alimentary tube is peculiar to animals, and of course distinctive of them from vegetables; but vegetables, though destitute of an alimentary tube, are not

destitute of alimentary organs. Each vegetable sends a lash of absorbent roots downwards in all directions through the earth in search of food, so that the surface of those loose particles, which have been worn off the rocks and washed down in the course of innumerable dreary ages, are bound together by alimentary organs into a sod. This radicating method of procuring food is incompatible with locomotion. In order to admit of locomotion, ways and means required to be devised of gathering a quantity of food, and carrying it about along with the absorbents. This has been accomplished in that simple and elegant style which characterizes all the works of Nature. The roots just became arranged into the formation of a hollow.—Here earth might perhaps have been deposited; but to seize upon other living beings, as so many extracts or quintessences of the earth, was both more lightsome to the animal, and consonant with Nature's plan of animal and intellectual improvement. Whenever this inversion of the roots commenced, that moment animal organs must have come into play, not only for locomotion, but also for depositing food in the

hollow. This is the beginning of the animal system, for vegetables are altogether vital; and, as you ascend from these lowest of living organized beings, you find the animal continue to bear a greater and a greater relative proportion to the vital. But from the one end of the chain of living organized beings to the other, the functions of digestion and absorption are under the immediate government of Nature herself, while the mere providing of materials for this vital system is the main and primary drift of all the animal functions.

In the lowest of living organized beings we find a complete exposure of the three fundamental organs, which are gradually, as they advance in structure and function, drawn in more and more from exposure, while the materials, for which they had formerly spread out, are now more plentifully supplied by voluntary organs. As long as the absorbents had to distribute themselves in all directions into the earth in search of food—as long as the leaves had to spread themselves out to the atmosphere—as long as the anthers had to

arrange themselves over the pistil, for the purpose of dropping their pollen upon the stigma, so long the maintenance and transmission of life could barely be accomplished; and organical improvement must have been almost precluded. But no sooner are the roots gathered together into a comfortable habitation, and supplied, without any trouble of search on their part, with one repast after another—no sooner are the leaves brought together, and furnished with an apparatus for drawing in, according to their requisitions, volume after volume of atmospheric air, than the chylopoetic and respiratory systems, like the finances of provident men, begin to advance fast in improvement. The alimentary tube elongates, and one auxiliary organ rises after another, until we find a stomach capable of digesting almost any thing, and bowels capable of absorbing to almost any amount. The breathing apparatus undergoes a corresponding improvement, and acquires one accessory organ after another, until we find a pulmonary and a circulating system, capable of producing and distributing vitality sufficient for the most active and

enterprizing exertions. But, along with this gradual improvement of the vital organs, there has gradually arisen and enlarged, the great and mysterious intellectual organ, with its subsidiary sensitive, and motive apparatus;—an organ which, in the low stages of life, seems quite subservient to the vital functions; but which, in the high human stages, seems, and can by itself be demonstrated, from a philosophical view of design and final cause, to be the great object for whose production and continuation the three vital functions had merely been necessarily instrumental.

In tracing the animal kingdom, from below upwards, we find, at the bottom, the alimentary organ to consist of a simple bag, with one orifice leading to and from. Here there are no spleen, no liver, no pancreas, no salivary glands. There is here nothing but the vegetable, with internal roots; a moving power, sufficient to bring nutriment to these roots; the sense of touch, for directing to the objects, and perhaps the sense of taste, for discriminating the wholesome manure, now entitled to

the appellation of food, from the unwholesome. A little way up in the scale, the animal has acquired a greater moving power, and, instead of being unwieldily globular, has become oblong; and, instead of having a simple bag with one orifice, is now furnished with a canal having an orifice at each extremity. This canal gradually becomes separated from the walls of the abdomen, into a distinct tube, which may be coiled up within the abdominal inclosure. Hitherto the food is the most simple, requiring little more than to be absorbed. When we rise a little in the scale of beings, their faculties and motions are increased; a more substantial food, and a more formal digestion, become requisite. The alimentary tube is now seen to swell out, near its commencement, into a bag, where the food is detained, and undergoes changes, and is also observed, soon after this stage of animality, to enlarge at different parts into what are called intestinula cœca, in which is found a fluid resembling bile, and, by and bye, into other intestinula, in which is found a fluid resembling pancreatic juice. These intestinula gradually, in the further pro-

gress of animality, become so many lobes of liver and pancreas, which ultimately coalesce into two distinct organs. By the time we have ascended to the class of fishes, we find liver, pancreas, and spleen. On ascending one step higher, we find the number of appendages to the bowels complete; reptiles being possessed of liver, pancreas, spleen, and salivary glands. As we rise above the reptiles, we find no advancement to the number of digestive organs, but a progressive improvement in their structure.

The lower the rank in the scale of living beings, the more limited is the range of food. Thus the lowest and most inert of organized beings, feed upon the crude substance of the earth, which is the primary source of food to all living creatures. Immediately above the vegetable kingdom, there commences a system of mutual depredation and devouring, which extends to the top of the scale, and becomes wider in proportion to the ascent;—nay, we cannot tell what wars may not be waged, beneath the surface of the earth, between the

various fibres continually pushing about in search of aliment. The greater the abilities, bodily and mental,—at first bodily rather than mental, at last mental rather than bodily,—the greater is the range of food. In this universal struggle among living beings, wisdom proves itself to be strength. Man, who is the strongest of animals, has a range of food that knows no limits, and a restless variation of appetite that makes him perpetually traverse this immense range. It is this appetite of the stomach for the necessaries of life, that gives rise to the universal stir and buzz in the animated world, lies as the basis of all our desires after the luxuries and refinements of life, and bears us out in all the complicated desires which spring up, and appear to carry us on in the struggle, long after the mere necessaries of life have become stale from superabundance. That the alimentary tube, from its commencement the mouth, throughout all its extent, and with all its appendages, is the territory of the animal appetites and passions, and that the stomach is their head quarters, are proved by all our mental sensations being referred to the region

of the stomach, and by all the pathology of that wonderful organ. As conversion of the food into chyle is the great office of the alimentary apparatus,—as the great drift of animal activity is to supply food—and as all the workmanship of Nature is perfect in its kind, and all the parts of her machines in mutual adaptation; so we have the digestive powers of the alimentary organ, not only directly indicating the animal appetites, but also indirectly indicating the degree of all the faculties, mental and corporeal, by which the struggle of life is accomplished.

The alimentary organ, as it supplies all the materials of renewal and growth of body, all the stones and lime which enter into the composition of the building, must greatly influence the size of the body. As the period of growth is the period when the first passages are moist and open, and when the mind is comparatively cheerful—as people of luxuriant growth are endowed with free secretions and excretions, and with comparatively easy, happy minds—as whatever is calculated to give a clearance

to the body from accumulations and obstructions, is so often followed by rapidity of growth and amelioration of temper—as happiness is always accompanied by a flow of saliva, and of all the other secretions, and of all the excretions in the body—as, on the other hand, the period in which the size of the body becomes stationary, or diminishes, is the period of dryness and boundness of the alimentary tube—as people of stinted growth have generally obstructions in the bowels, and often tumefactions of the abdomen—as not only suppressed growth, but also that dry and costive condition of bowels which causes the suppression, are accompanied with discontentment of mind—and as anxiety lays a check upon all the secretions and excretions in the body; so the stature must stand indicative, through the medium of the alimentary organ, of the state of the animal appetites. Contentment seems to promote growth by promoting a flow of secretions, which are to the animal what rain is to the vegetable. How fraught with wisdom is that law of nature, which ordains that discontentment of mind, by laying a check upon the secretions,

shall impede growth, and thus so far preclude danger and destruction from her more peaceable and contented creatures! In these dangerous animals, the chyle, instead of being employed over the body in supplying growth, is hurried off to supply respiration, and thus to enable the animal to carry on its predaceous exertions; so that here, the machinery only is limited, while to the employment of this limited machinery there is given unlimited, or rather indefinite scope. The whole animal department of the body may be viewed as a crop growing out of the vital department. As a rich soil yields tall vegetables, so a generous vital soil yields tall, goodly animals; but as a dry, terrestrial soil affords diminutive, scraggy, prickly, deleterious plants, so a dry, unfertile, vital soil gives growth to comparatively small, active, turbulent animals. Not only the growth of the body, but also its obesity, is dependent on the condition of the alimentary organ, and of the animal appetites and passions resident there. Anxiety and discontentment, as they forbade growth of the essential parts of the machine, also forbid any stores of ammunition

to be laid up. Accordingly, not only the timorous animals, which are ever under the corrosive apprehension of danger, but also all furious, rapacious animals, are comparatively destitute of fat; whereas ease and contentment, whether enjoyed at the hand of Nature or of man, in verification of the proverb, induces fatness. For the reception of all the fat that can be hoarded up, Nature has provided a vast cellular reservoir, extending throughout the whole body. But even in the most easy, contented, and happy animals, unlimited scope is not given to the deposition of fat, lest food should be wasted, or animals become useless or monstrous. Accordingly, it has been ordained, that the principal deposition of fat shall take place over the very surface of the stomach and bowels themselves. Thus a check is gradually reared by obesity itself, at its very source. As of all the vegetables and animals with which we are surrounded, every plant and every animal has its respective range of stature in the midst of all the various situations and circumstances of life, so every human being has a peculiar stature, and a peculiar fatness,

at which he has a tendency to arrive, so that a full vigorous man, after having been shrunk by disease or privation to skin and bone, will, on the recovery of health, in the one case, and on the attainment of food in the other, gradually enlarge, until he fills up his former dimensions, and there he will stop, and appear as if nothing had happened. It is not to be understood that all men have arrived at their amplitude, and that no improvement in food and circumstances can give addition to the fatness and even to the stature; but, that, under given food and circumstances, every man has a peculiar size at which he will arrive, and that every man has a certain extreme amplitude, beyond which no increase of food and circumstances can carry him, unless some radical change be effected on his constitution.

As the alimentary organ is the region of the animal appetites and passions, and the great laboratory from which the materials of growth are derived, so the food, from constituting the very materials themselves which enter into the composition of the body, must influence

the growth, and, from influencing the condition of the alimentary organ, must influence the animal appetites and passions. The natural history of the earth, whose primitive formations contain no vestiges whatever of organized beings; whose transition formations contain remains of the rudest of organized beings; whose floetz formation contains the remains of a great variety of organized beings; and whose alluvial, the most modern formation, contains the remains of even man himself, teaches us that all vegetable and animal sustenance must have been primarily derived from the earth. But we do not need to dip through the crust of the earth in search of proof, for we are so far able to unravel the complex chain of mutual depredation among living beings, as to demonstrate that carnivorous animals, although they sometimes devour one another, yet, as a whole, subsist on granivorous. Vegetables, therefore, bear the whole burthen of animal sustenance, and the earth bears the whole burthen of both animal sustenance and vegetable. Thus all the various tribes of living beings forage up the hill of life, in due

order and succesion; but, having gained their respective summits, tumble down in one promiscuous feast to the surviving. Although man has his ultimate dependence for subsistence upon the surface of the earth, yet, as he is enabled by agriculture to store up a sufficient quantity of vegetable produce, from a surface however sterile, or by hunting or pasturage to have the grass manufactured into flesh, and by cooking to have the whole rendered more savoury and nutritious; so the quality of the soil must have comparatively little influence on his stature. The more animals rise, so to speak, from the ground, and the more their faculties multiply and improve, the less influence has the soil in determining the stature. These acquired, moral and intellectual faculties now so far usurp the place formerly held by physical circumstances, and become influential of the stature. Thus the soil has the greatest influence on the stature of vegetables, and the least upon that of man. How far the various kinds of food, from the most simple to the most vital, influence the stature, is a rich and interesting field of research. It may, in the mean-

time, be laid down as a general rule, that food, derived from beings of low and simple organization, gives a tendency, other things being equal, to luxuriance and lankness of growth; and that food, derived from beings of high and complicated organization and of great vitality, gives a tendency to compactness and firmness of structure. This difference may, perhaps, proceed from the less or greater stimulation of the stomach, and of its animal appetites and passions, rendering the character less or more ferocious, and giving a less or greater tendency of the carbonic materials to respiration. Accordingly, over the whole animated world, the soft, easy characters, other things being equal, have lank, exuberant, unwieldy bodies; whereas the ravenous and turbulent characters are packed closely and firmly up within small dimensions. Thus, size and strength are made to place limits upon each other.

Food, the more it has been elaborated or cooked, by successive digestion, imparts the greater stimulation to the appetites and passions. The stimulating quality of the food, does not

seem to carry its influence beyond the precincts of the alimentary tube, for different kinds of food furnish nearly similar chyle. By bringing a granivorous animal gradually to feed upon flesh, you gradually kindle up the appetites and passions, and gradually convert the character towards the carnivorous; on the other hand, by gradually bringing a carnivorous animal to feed upon vegetable food, you gradually cool down his appetites and passions toward the tame, granivorous character. Indeed, it is necessary that the appetites and passions be stimulated in proportion to the number of successive digestions, which the food, since its origin from the earth, has undergone; for more courage is requisite to overcome the prey. This is a specimen of that beautiful and accurate adaptation with which the works of Nature are dovetailed into each other. Not only is the food proportioned to the work, but the work is also necessary for the proper digestion of the food: thus the keenness of appetite, and the violence of passion, that kept the whole forest in terror, abate in the cage in spite of the daily repasts on flesh and blood.

In order to keep the appetites and passions up at the highest pitch, the animal must gormandize upon the very victim, in the pursuit and seizure of which, these appetites and passions had been set on the keenest edge. It is then a glorious repast, a feast of victory; accordingly, ferocious animals have been observed to spurn a carcase, and to bound forward after the living, in order to gratify the natural rapacity. As we formerly found that the size of the body was impeded by dryness and boundness of the alimentary organ, and by discontentment of mind, so we now find that animal food, which heats the appetites and passions, and renders the alimentary tube dry and costive, impedes the growth, but gives firmness to the structure; whereas vegetable diet, gives a luxuriance to the growth, but at the same time, a looseness to the texture. When omnivorous man, whose stomach readily accommodates itself to any digestible food, is fed upon vegetables containing little nourishment, he becomes phlegmatic; when he is fed upon more nutritive vegetables, he becomes somewhat brisker; when he is fed on the

flesh of granivorous animals he becomes violent; when he is fed on the flesh of carnivorous animals, he becomes almost intoxicated. When we thus see before our eyes the marked effects of food upon the appetites and passions, what effects may it not produce after operating through successive generations. How well these experiments tally with the relation that subsists throughout the whole animated world, between the food and the animal character!

As respiration is the source of animal energy, and as all healthy chyle, from whatever food derived, is alike to the lungs, so the quantity of food expended in respiration, must mark the degree of animal energy. The more fuel, within limits, you throw upon the fire, the greater heat and light shall be produced, but if you throw in too much fuel, you choke up and may even extinguish the fire; so if you throw more food into the stomach than can be digested, and expended upon respiration, or hoarded up in reservation, you choke up, and may even extinguish, the vital functions. Nature endeavours to make digestion

supply the requisite carbon to respiration, though not with a puny, scrupulous accuracy, that admits of no latitude. As long as the signals of hunger, and of satiety, are regularly obeyed, so long shall the digestive organ be free of any participation in the admission of disease; but no sooner are these signals disregarded—no sooner are the watch posts forsaken, than the whole territory lies open to invasion. As the sensation of hunger is more poignant than of satiety, so Nature seems inclined that any errors in the quantity of food, should be on the side of superabundance, rather than of scarcity. Scarcity is more safe to individual life, but leads to degeneracy, which Nature abhors as she abhors a vacuum. Superabundance on the other hand, although more dangerous to individual life, is conducive to animal and intellectual improvement, which seems to be the great end of our existence; besides, that very superabundance, which leads to the disease, shall also, by increasing the ability, bring about in due time the cure. By adding coals to a fire gradually, as the heat and flame increase, or by adding many coals

at once, while you blow up the fire with the bellows, you increase its heat and flame; so by gradually increasing the diet, you may gradually raise the energy to greater enterprizes; or, by suddenly increasing the food, and at the same time redoubling the exertions, you may suddenly raise the energy to greater enterprizes; or, by redoubling the exertions, you will soon stir up the stomach to an additional craving for food. The appetite, disease being apart, is always proportional to the energy, whatever be its mode of exertion. Contrast the hare, or rabbit, nibbling at a leaf of sallad, with a dog of the same size, devouring more than the meals of them both at every morsel —we found that the appetites and passions were violent in proportion to the stimulating quality of the food—we now find that the energy is great in proportion to the quantity of food, not to the mere bulk of ingesta, but to the quantity of chyle which they afford. Thus over the whole animal kingdom, we will find the appetite to correspond with the energy—we will find the most energetic animals to be the greatest gormandizers.

That food, which, from the least bulk, furnishes the greatest quantity of chyle, is the most conducive to intellectual improvement. Occasional fasting, by which the digestive organs get a clearance and a rest, is beneficial to the intellect; but is beneficial, or even allowable, only in virtue of the generous diet which has preceded. Occasional fasting, and habitual fasting or starvation, are two very different things, and produce very opposite effects upon the mental, as well as upon the corporeal powers. There is nothing that induces so keen and so speedy hunger as a proper mixture of mental and corporeal exercise, with either ingredient predominating according as brain or muscle predominates in the composition of the individual. The health and vigour that accompany a proper combination of mental and corporeal exercise, are a strong declaration in favour of activity and intercourse with society, in preference to the abstract speculations of a closet. In drawing a comparison between mental and corporeal exercise, we must take into account the constitution of the individual; for corporeal exercise must be most suitable to the athletic

constitution, and, to the generality of athletic constitutions, pure mental exercise is not only unsuitable but almost impracticable. There is no kind of exercise that depends so much as mental upon a good appetite and a good digestion: mechanical exercise may proceed in spite of the greatest languor or sickness of stomach, but mental exercise requires the appetite to be tempered with the keenest edge, and the whole digestive powers to be set in the nicest trim. When, from whatever cause, there is the slightest languor or oppression at stomach, then, like the crows in rainy weather, the muses cannot ascend into the regions of fancy; nor, like the electrical machine in the midst of moisture, can the mind of the philosopher be fired for the explosion of discoveries and inventions. The instrument is altogether out of tune, and out of repair, and the notes will become harsher and more discordant at every successive attempt to make the music flow. Mental exercise, as well as corporeal, promotes the secretions and excretions, and must also increase respiration; for intense study always accelerates the circulation, especially in the head, for the face red-

dens, the eyes brighten, the carotids pulsate strongly, and the jugulars swell. It is perhaps, however, more by promoting secretions and excretions than by an increase of respiration, that mental exercise sharpens the appetite. Although mental exercise requires a good digestion, and a plentiful supply of nutritious food, the conclusion is not legitimate, that mere food shall, in proportion to its richness and abundance, increase the intellect. The intellect, in order to be improved, must be cultivated; but in order to be cultivated to purpose, must at the same time be well manured from the vital functions. An abstemious man may become the poetaster or the philosophaster—may excel the most expert of all the mimical tribes that contribute so much to our diversion; but cannot proceed a step beyond the boundary of the imitation stage, cannot muster up intellectual energy to spring forward upon discoveries and inventions. A sufficient distinction has not yet been recognised between the imitative and the creative genius. Mental exertion and a copious supply of food are not of themselves sufficient to produce the creative genius. Something more is

necessary, as shall be shown on our arrival at the brain. That a clearness of stomach is generally accompanied by a clearness of understanding, is apt to delude a person into the belief that spare diet is conducive to mental improvement. It is during hunger that the faculties of the tiger are in the best condition, that he may be enabled to procure a new meal; and it is after the stomach has nearly emptied itself, that the faculties of the philosopher are in the best condition, that he may be enabled to renew his scientific pursuit after more food; for Nature makes one law regulate at once the whole range of living beings—makes the same law turn the tiger out of his den to a search for prey, and set the philosopher into his study to prowl after knowledge, which is just an indirect mode of procuring food. A meal introduced into the stomach appeases all the appetites and passions, and obtunds all the faculties; as if Nature had declared that she takes no pleasure in unnecessary devastation and slaughter. But although both the tiger and the philosopher have their appetites and faculties in the keenest and strongest state during hunger,

yet there is no fair logic in the inference that, if hunger were continued without any intermissions of satiety, the appetites and faculties would also continue keen and strong. Hungry tigers and philosophers are very different from starved. But full generous diet, in order to be conducive to mental improvement, must not be carried beyond the digestive powers of the stomach. To overcharge the stomach is just to keep it in a continual state of satiety. A complete surfeit renders the mind almost vacant, and complete gluttons are for the most part complete idiots.

Thus the food not only constitutes the materials out of which the animal machine is constructed, and the alimentary organ not only forms the great mould in which it is cast; but the food also forms the ammunition by which the movement of the machinery is effected, and the alimentary organ also gives residence to what shall afterwards give a spring and a spirit to the whole. But all this arrangement of matter into the size and configuration of an animal, could not have been accomplished by the food and the ali-

mentary organ themselves, and, though accomplished, would have been of little more avail and of far less duration than the statue which the imitative fingers of man can sculp out of the rough slab. Even the food could not have found its way into the stomach, nor could the alimentary organ of itself have proceeded one step in the process of digestion. The vital spark behoved first to be struck and to be fanned, and every particle, supplied by the alimentary organ, required to be vivified by respiration, before admission into the service of the animal economy. Thus the alimentary organ, with the co-operation of the respiratory, gives size and shape, while the respiratory organ, with the co-operation of the alimentary, imparts power and activity. Of all the organs in the body, the lungs and heart seem to have most called forth the solicitude of Nature; for we find them surrounded by all the means of protection which the incessant motion of respiration could admit. In front there is a shield of bone—behind there is an impregnable pillar—on either side, from shield to pillar, there are spars of bone, more defensive from their elasticity than their

strength—while the two main instruments of executive power overhang the whole, especially at the more defenceless parts. This manifest solicitude of Nature, for the safety of the lungs, might have sooner awaked inquiry, and led to a more just appreciation of respiration and of circulation subservient to it. The very structure of the lungs, and especially those wide and numerous channels which give continual transmission to mighty streams and innumerable streamlets of warm living blood, over and above an ordinary quota through the pulmonic arteries, might have suggested a strong hint that something great and indispensable is performed here. The whole sanguiferous system consists of two circulations, of these the pulmonary is the very first. If the value and importance of an organ are to be computed from the quantity of blood circulating through it, then the lungs shall balance, and more than balance, all the the rest of the body put together. The great and incessant motion of respiration might have also summoned attention and investigation; but familiarity breeds contempt in the philosophical as well as in the social world. As all the

mysterious and wonderful scenery, in the midst of which we are placed, and all its more mysterious and more wonderful movements gradually become more and more common-place, until we are shaken, out of our lethargy, by an earthquake, or roused, out of our slumberous apathy, by a peal of thunder; so the great and mysterious power, which silently supports the respiration of myriads of living beings, is not seen and acknowledged, until the process is about to cease, and the curtain about to drop,—the very scene in which the divine hand is least discernible.

Although the vital organs are not directly indicative of the mind, yet so dependent are the animal organs upon the vital, that, from them, both the animal organs and the mind, such is the regularity of Nature, are perhaps all deducible. The great vital substratum, from which the crop of animal organs has sprung and continues to derive support, is therefore well worthy of examination; although, from interior situation, incapable of furnishing materials for practical physiognomy. But, as if Na-

ture were determined to show her preference of the animal department, she has made the continuance of the great vital function to hang directly from her favourite brain, by entrusting respiration to voluntary muscles. Accordingly, whenever the intellectual organ, the great ultimatum of animal existence, is destroyed, or so far injured as to be rendered incapable of performing its functions, respiration forthwith ceases. Had not such link of connexion been established, the vital organs might have continued to live, after motion, and feeling, and intellect were destroyed, and thus the world would have been encumbered with useless devourers.

Pure air is more necessary, than wholesome food, to health, inasmuch as unwholesome food, after having undergone all the preparations and purifications, is rendered almost wholesome before its arrival at the scene of action; whereas the air, removed but a few feet above a diversified surface of vital and chemical materials, is carried, with whatever exhalations loaded, directly to the scene of action—to the very centre

of life. But the air, independent of the admixture of other bodies, varies in the different altitudes above the level of the sea, in the revolutions of the seasons, and in the unceasing vicissitudes of the atmosphere. In proportion to the warmth of the surrounding medium, the decomposition in the lungs is the slower, and in proportion to the rarity of the air that is breathed, whether during a high barometer on the earth, or during a high barometer in the balloon, do both body and mind become enfeebled. Whereas the cool and the heavy atmosphere imparts vigour to both the corporeal and mental faculties.

On limiting our views to those animals which breathe by means of a thorax and diaphragm, we will find that the amount of energy, corporeal and mental, other things being equal, is proportional to the capacity of the chest. Every horse-jockey knows well the importance of a capacious chest, from which he can, very accurately, calculate the powers and durability of the animal. What applies to the horse, applies equally to his master. In making our measure-

ments of chests, let us recollect that the diaphragm presents, towards the abdomen, a concavity, whose depth varies in different animals, so that there are always less breast and more belly than appearances indicate; but how much less of the one or more of the other, the rules for determining remain to be discovered. In the mensuration of the chest we have three dimensions,—length, breadth and thickness. Had the chest been cylindrical, its size, like that of a tree, might have been cast up from the length and girth. The present mode of taking the circumference is, therefore, inadmissible—is merely an approximation to the truth. In speaking of the dimensions of the chest, we must attend to the position of the lungs. Although the lungs have their fixture behind, at the back bone, and stretch forward, on either side, to the breast bone, yet, as the windpipe, which is the main part of the lungs, enters the chest from above, and extends to its bottom, so the extent from the neck to the diaphragm is the length of the chest, and marks the duration or perseverance of energy. As the air vessels run first downwards and then forwards, so the ex-

tent of chest, from side to side, determines the amount of ramification, and indicates the degree, or force of function, and consequently of energy. The broad chest not only bespeaks capacious lungs, great respiration, and powerful energy, but also affords the most advantageous origin to the important muscles of the neck and head, and of the arms. As the entrance of air into the chest is from above, and as the entrance into the lungs is from behind, so the air must pass downwards before it can get forwards; therefore the more the lungs stretch forward in the direction from back to breast, instead of extending far down along the back bone, and thus giving a circuitous route to the air, the more ready and direct is the passage of the breath. Accordingly, the deep chest is calculated for rapidity of respiration, and denotes promptness and rapidity of energy. The narrow chest is conducive to swiftness, not only by affording to the muscles the most advantageous position for running, but also by being so well calculated for cutting the air. The deep narrow chest is the characteristic of swiftness and weakness—of timidity. The broad chest is the

characteristic of strength and courage. The long chest is the characteristic of perseverance. The greater the cubical measurement, computable from these three dimensions, the greater is the quantity of energy, without regard to its quality.

The energy, if not accurately proportional to the size of the chest, and to the quantity and quality of air inhaled, must always correspond with the quantity of air decomposed in respiration. To what purpose the energy or vitality so produced, shall be devoted, belongs not to the lungs; their duty is merely to carry on the work of decomposition, according to the total requisitions of the body; while the distribution to the various organs is regulated, as the market is regulated in the commercial world, by their respective demands. If allowance be made for the extraordinary expenditure of vitality by the laborious operation of flying, the courage, as well as the strength, will turn out to be proportional, other things being equal, to the amount of decomposition.

The strength and courage are in the inverse ratio of the frequency of breath. While timid animals increase their energy by increasing the frequency of respiration, and increase their flight by increasing the frequency of their steps, the courageous animals increase their energy more by depth than by frequency of breathing, and increase their speed more by lengthening than by quickening the step. Observe how firmness and confidence, whether temporary or permanent, are accompanied by slow breathing, and how a panic renders the breathing quick and irregular. By giving swiftness to the timid and weak animals, Nature has put a necessity of exertion upon the courageous and strong, while their ultimate success is secured by their durability. But in so far as the general plan of animal improvement shall not be interrupted, Nature seems willing to favour the weak and timid: thus, the sobbings of sorrow, and the screams of fear, are performed during inspiration, by which the energy and spirits are increased; whereas the threatenings and exclamations of dangerous rage, and the

giggling of poignant laughter, effect their own exhaustion by their expiratory efforts.

Our food, after having been elaborated into blood, not only supplies renewal and growth to the body, and carbonic materials to that wonderful function, by which vitality is secerned, but also conveys this vitality to all the parts of the body. The physiologists, before Harvey, felt themselves at no loss concerning the circulation of the blood, and of the animal spirits. The faculty of imagination supplied that conjectural knowledge, which, like a swimming bladder, buoyed up the human mind, until it landed on the discovery. The circulation of the blood is not half discovered: we see only a segment of the circle—little more than the palpable currents that proceed to, and from the heart. In the issuing of springs, in the falling of dews and rain, in all these circulating over the face of the earth, and then ascending in vapours, to descend again in rain, or dribbling through the crevices of the earth, to rise again in springs, we have the most vague circulation. As we ascend in the scale, we find the cir-

culating fluid more and more substantial and vivified, the channels more and more circumscribed or inclosed, their currents more and more defined, and concentrated into a unity of destination. Blood is not the only circulating material, and there are more circulations than one in the human body; for all the living materials of nature are undergoing circulation, and the most perfect of these materials are undergoing the greatest number of circulations. But the circulation of blood is the most important of them all; and though not a primary function, is yet absolutely necessary in the animal economy for distributing vitality over the body, in the same way as commerce, though not productive of food, is absolutely necessary to its distribution amongst all the mouths of the nation. As the circulation of blood serves to distribute vitality to all the organs of the body, so the rate of the pulse must mark the rate at which the various functions of the body proceed. Here the analogy between the circulation and commerce still holds good; for, as a rapid commerce is, in the very nature of things, neither steady nor lasting, so a rapid circula-

tion betrays the flow of spirits to be neither of certain, nor of long, duration. There is a sudden impulse, and the struggle is soon over; whereas the slow pulse represents the steady, persevering push, that grows stronger in proportion as the resistance increases. As the rate of the pulse, other things being equal, is inversely as the stature, which again is directly as the strength of body and the coolness of character, and as debility and all the emotions that are allied to fear, are accompanied by a quick irregular pulse, extending from the heart throughout all the circulation, so the slow pulse must mark the cool determined character. As less or more of that mysterious thing called time is necessary for every performance, and as more is generally necessary in proportion to the difficulty of the performance, so we may easily see for what kind of performances and achievements, the being of great and slow movements, is designed. In every movement that we perceive around us, quickness argues imbecility, and is quite inconsistent with any notion that we can force ourselves to form of greatness or dignity.

Now that we have got these two great fundamental organs, alimentary and respiratory, put together into vital movement within an envelopment of animal organs, and that we have seen the close and abject dependence of the animal department of the body upon the vital, for life, growth, and activity, let us now shortly inquire how far the vital is dependent upon the animal department.

The recollection of vital organs having existed prior to animal, throws over the latter something like the colour and title of accessory. Now, however, that the roots have been, as it were, lifted out of the earth, and the leaves, as it were, drawn in from the heavens, in virtue of this animal envelopment; the vital have become as dependent upon the animal organs for food and air, as the animal organs can be upon the vital for vitality. There is indeed a mutual dependence which cannot, with impunity, be in the smallest degree broken asunder. If the voluntary muscles refuse to do their mechanical part in respiration, the lungs die as soon and as completely as

they; and if the limbs, as the fable goes, mutiny and rebel against the belly, it and they shall alike fade away, and die in company at last. Here, then, is a dependence of the vital organs, for those very materials without which they could neither live themselves, nor impart life to the rest of the body—here is a dependence of the vital, upon the animal organs, for the means of life—virtually for life itself. But not only does the life of the vital department of the body depend upon the absolute performance of the animal functions, but also the health of the vital department depends upon the due performance of these functions. All the animal functions may be divided into mechanical and intellectual. Animals are not only endowed with the faculty of motion, but also all the organs of the body are adapted to this faculty, and constructed upon the principle that it shall be put to due exercise. Instinct, that early stage of the intellectual organs where the sensitive overbalances the sensorial, and motion, both which were at first mere subservient appendages to the vital functions, have now, in that gradual revolution to

which all the works of nature have been subjected, wheeled round to the top of the system; so that the vital functions are now worthy of regard only in so far as they impart life and size to that wonderful organ which plans, and to that complicated system of organs which execute.

The health of the body at large depends upon the due performance of all the functions: but upon motion, which is so necessary to corporeal as well as mental prosperity, and seems to have been calculated upon by Nature, in the construction of the body, there has been appended the health of every other function. Nature has not been sparing in erecting moving machinery, but she has thrown upon us the duty of keeping it in repair, by keeping it in use. Our experience, which is the only language in which Nature addresses us, declares that we were made for activity, and that there is no rest for us here; for if we refuse to move about, we do not merely fall backwards towards the inertitude of stationary vegetables, but we also fall into disease. Nature will not

dispense with the due performance of any function, more especially of one upon which so closely depend the well being and improvement of intellect itself. Animals, in the wild state, are urged by hunger to move about in search of food. The toil of procuring and eating, and the plenitude of the stomach, induce sleep. On awaking, hunger impels to a new pursuit. Here the animal has to toil for every meal; and the stomach is fairly emptied, before even a search after more food is renewed. Here, therefore, we meet with no disease. But when an animal has arrived at a certain degree of intellect, he begins to calculate and to look forward, and soon becomes dissatisfied with this precarious subsistence. He now hoards up supplies, that he may eat and drink at will—here the errors in eating and drinking commence. He now eats on the smallest sensation of hunger—thus his meals become more frequent. He has now leisure to prepare and improve his food—thus a variety of savoury and luxurious dishes, and of gratifying stimulating drinks decoy the appetite, now regardless of satiety, into immoderate meals. This is not the amount of the mischief.

Not only are the meals too frequent, and too large; but the exercise which was necessary for even the moderate and infrequent meals is now diminished. Had the increase of food been accompanied with a proportional increase of exercise, disease might have been precluded. Had the increase of food been accompanied with even the former degree of exercise, disease might have prevailed. But when the increase of food is actually accompanied with a diminution of even the former degree of exercise, need we wonder that disease should so abound among the human race, that health has become a relative term, signifying merely a less degree of disease than is sufficient to tumble a man into a bed of sickness. Upon the mechanical part of the animal department of the body, therefore, both the vigour, and the health of both body and mind, in a great measure depend.

But when we enter upon the intellectual part of the animal department of the body, we enter upon the region where all the ills, bodily and mental, private and public, real or ima-

ginary, are registered. Here the balance is struck, which is to determine the happiness or misery. The brain is not the region where happiness and misery is felt, but is the counting house of the stomach, where the intellectual faculties, like so many clerks, are conducting the business, and writing up the books of that enterprizing, though too often speculative, concern—the animal appetites and passions. The stomach is the region where happiness or misery is felt. It is in the region of the stomach where the thrilling glow of joy, and where the gnawing pang of grief and of remorse tell upon the consciousness and upon the conscience. In the brain there may be pain, or confusion of intellect, or delirium, or stupor; but it is in the stomach, where anxiety, sorrow, melancholy, and madness take up their quarters. People, in speaking of the heart, point to the stomach. All the vicious, and all the virtuous passions and dispositions which have been, by both sacred and profane moralists, ascribed to the heart, are engendered in the stomach. The heart is a secondary organ, and its palpitation and fluttering are secondary symptoms that

belong to flatulency and fear; but the mental sensations at the stomach proceed directly and promptly from the cause of happiness or misery, and exercise a most imperious sway over the whole man. The stomach may be styled the passive voice of the animal, and as such is liable to be governed by all the substantives around; so that human life might almost be written out in the passive voice.

Individual happiness depends much on the structure of society. If all the myriads of living beings which keep for ever ranging over the face of the earth in pursuit of the necessaries and comforts of life, were left in a state of anarchy, interest would get the better of justice, and rapacity would be the ruling order of the day. Political governments, therefore, in the wise arrangement of Nature, spring up to let every man in this struggle have fair play, and to let him keep and enjoy what he has acquired. The rights of man are the very basis of his happiness. As every thing in this world goes by power, it becomes the duty, and indeed is the main purpose, of the political govern-

ment to step forward and supply the want of individual strength, and thus to become the guarantee of every man's rights. But although a political government has so much influence upon the prosperity and happiness of the individual, yet the family government established in every house, and the individual government established in every breast, have not only the main influence upon the prosperity and happiness of each, and of the whole, but also in the slow and silent diffusion of moral improvement determine the size, and shape, and motion, of the political government itself. Radical improvement in the morals and intellectuals of the mass of a people must, in the end, work a corresponding improvement in the government; but the difficulty and slowness with which improvement ascends from the people to the government, the tenaciousness of those in place to things as they are and have been, and the repugnance against innovation, whose object would be retrenchment;—all these tendencies to immutability, although a slight check to human improvement, are the finest guarantee of our rights and privileges, and render the

march of human affairs sure, just by rendering it slow. As the British political constitution surpasses all the political systems in the world, so a Briton, for size, and figure, and strength, and courage, stands at this day unrivalled amidst the countless population of the earth. In such a nation of freedom, every individual is a distinct independent being, possessed of extensive immunities. Were a full and complete history of human affairs to be written out, every hut and every hovel in this land of liberty and might, would furnish materials for a volume; and the omission, in the complicated detail, of the most insignificant amongst us, would render the whole narrative incomplete. Each possesses, and knows that he possesses, a will and a government of his own. The consciousness of this naturally expands the breast, and buoys up the whole body and mind. If even temporary prosperity renders the body erect and sprightly, the gait elastic, as if the whole frame were set on springs, while the trembling earth resounds its sovereign's tread; how much more must freedom, and prosperity, and happiness, operating through a succession

of generations, amplify the human stature. A nation of slaves, on the contrary, are crushed down, in body and mind, in proportion to the weight of tyranny. Here an individual constitutes merely an insignificant part of a great machine. He is nothing in himself. His natural spirit, having no scope, dies away. He crouches under the rod, and the height of his ambition is to escape corporal punishment. How the bodies of such wretches, as well as their minds, must be depressed, may be inferred from the effects of partial slavery, or temporary adversity, upon the firmest and most undaunted amongst us. Under the anxiety caused by adversity, we breathe so low, that an occasional sigh is demanded to keep up vitality. For want of new chyle the substance of the body is carried off to supply respiration. We creep rather than walk; and the whole frame is relaxed, and ready to fall for lack of support to the ground. Since a life-time of such misery has the effect of giving a permanent reduction to the stature, how much more must misery, and the prospect of misery, from generation to generation, curtail human growth. There is indeed, such a self-

accommodating tendency, in the human mind, to circumstances, that a passive submission to slavery may grow into a complete reconciliation, which shall take off all the restraints upon growth; but the organ of energy cannot have received a corresponding augmentation, so that this animal growth shall resemble lank, unproductive vegetation in the shade. The amplifying effect of liberty upon the stature may be seen in the strength and courage of the lower animals in those parts of the world where mankind are rude, and in the lankness, and weakness, and timidity of the lower tribes, where man, the ruler, is in supreme despotic authority. The history of the human stature is involved in the darkness of antiquity. The stories of the gigantic colossal stature of primeval times, though partly fabulous, may be not altogether without foundation; for the farther back we trace the antiquarian history of man, the more unprotected has he been, and the greater animal strength must he have required, to maintain his mastery over the lower tribes, and to stand his ground against his neighbour. This period, in which man may be supposed to have

just gained complete ascendency over the lower tribes, and before rude political institutions had arisen to curb human freedom, is the very period, when boundless freedom would give the most free scope to the growth. Mankind, however, having gained complete supremacy, would not be long of employing their prowess in fits of envy and ambition against one another; hence rude political institutions would arise, human freedom would for a time decline, and human stature would decrease. Here Nature makes the cure grow along with the disease; for that very diminution of stature—that very drawing in of the body—by condensing and concentrating the passions and energies, ultimately rouses the oppressed people to fight out their freedom. This sinking of the stature of a people, in consequence of privation of freedom, is like the stooping and drawing together of the body, previous to springing forward upon some daring enterprize. Thus Nature declares that her creatures shall never be happy till they be free, and that the human soul must, by its own exertions, make room for itself within the body. Not only mankind, but also the whole animat-

ed world, are easy, and happy, and contented, other things being equal, in proportion to their size; and, in the inverse ratio of their size, are more and more discontented, and restless, and active. The smaller animals are so far kept in this contentious trim, by having many equals and superiors with which to contend; whereas the larger animals, having few competitors, or rivals, or antagonists, become confident and supine. The enslaved descendants of a once great and a once free people, are here and there to be seen shooting up into respectable stature, and with chests still expanding into capacious; for that general law of Nature, according to which children resemble their parents, cannot be overcome at once. But upon the whole we find that the stature bears proportion, other things being equal, to the enjoyment of freedom—not of pure unadulterated freedom, of absolute freedom, of freedom in the abstract—but of such freedom as the moral and intellectual faculties of the people enable them to enjoy.

Freedom also produces variety of bodily size and conformation. The more a people is en-

slaved, the more is it uniform—the more a people is free, the more is it diversified. This diversity in size and configuration, along with its accompanying diversity of character, produces a variety of ranks in society; while this variety of ranks, by reaction, tends to increase the diversity of size, configuration, and character. Freedom brings about this diversity by giving scope to the human mind, and thus allowing it to roam about into variety of situations and occupations. It is this variety in situation and circumstances that has, on the large scale, produced the variety of animals. It is this very variety that has cast up such a variety of human tribes, and of human individuals. The sameness in the situation and circumstances of individual species and genera of animals has produced a uniformity in their bodies and characters. Any species or genus, however naturally uniform, when spread out by domestication into a variety of situations and circumstances, is soon thrown into a proportional diversity of body and character. The variety of ranks in human society is as necessary, and serves a similar purpose on the small scale, as

the immense gradation of animals on the large, serves to fill up all the interstices of society, so as to increase the sum of life, and by rendering society more complete, to increase happiness, not only in the sum total, but also on the average. Mankind have never yet been found so unaspiring as to be altogether destitute of distinctions in rank; even the very cattle in a park have their rules of precedence. The more mankind ascend out of rudeness, the more ambitious do they become, and their variety of ranks in society becomes the greater. If, however, we make comparative estimates of the distinctions in rank that prevail in the various stages of civilization, we will find that, in the rudest society, there is the greatest distance between the highest rank and the lowest, and at the same time the least variety of ranks—here the chief or king has the very lives of his subjects at his own disposal—that, on the contrary, in the most civilized society, there is the smallest distance between the extreme points, and at the same time the greatest variety of ranks. Thus, during a race, when the goal is yet at a great distance, the runners are far separated, but get

closer and closer as they approach the goal. Mankind, indeed, may be said to be in a race. They are nearly equal at starting. They soon separate widely. At length, as the object of pursuit becomes clearer, they become emulous, and the chace thickens. Thus we find, that in the progress of civilization, although the variety of ranks becomes greater, yet society is tending more and more to a state of equality. Accordingly we learn that the varieties of the European countenance were formerly few but strongly marked: in Britain, for example, there were provincial peculiarities of bodily shape, and features so strongly marked, that each district seemed a distinct race of men, while there was a striking similitude among the individuals of each district. There is now but one national body, and one national mind, though with individual differences and shades equal to the number of inhabitants. Even nations and continents are fast assimilating, and shall all ultimately become as one diversified family.

Although a general division has been formerly made of the human body into vital within,

and animal without, yet, when we make an actual removal of all that is animal from all that is vital, we find remaining not only the internal parts, but also the external covering of the whole body, with innumerable pipes and strainers between the internal surface and the external. What intimate sympathy subsists between these two surfaces might be partly estimated from their continuity, and from their free communication, at all points, through the medium of the tubular system, as also from their interchange of office in some of the lowest animals, which can with impunity be inverted like a purse. But although, after removing all the animal organs from the body, there remains, among the vital list, the skin, as a covering and as an organ of perspiration, yet the entire skin does not remain; for, in removing the animal organs, we have torn out from it the nervous papillæ of the sense of touch. The skin then is both animal and vital, and is the better adapted for one capacity in proportion as it is better adapted for the other. The elasticity of the skin as a covering, and the permeability as an organ of perspiration, are both conducive to

the office of touching, and, by bracing up the muscular system, to the office of catching what is touched; while keenness of the sense of touch, by exciting an increased circulation through the skin, promotes its elasticity and permeability. Let us, therefore, take a survey of the skin in its whole extent, not only as a counterpart to the internal absorbent surface of the vital organs, but also as a counterpart to the internal sensitive surface of the stomach, by giving sensation of objects without, in reply to the sensations of hunger and thirst within; for we must not view the large imposing surfaces of peritoneum and pleura to be the central surface, but, recollecting the polypus, we must view the inner surface of the alimentary and respiratory canals, and especially of the stomach, as the central surface, in contradistinction to the skin, the circumferential surface. Let us, in short, take a survey of the skin not only as a coverer and exuder, but also as the organ of touch, the primary and fundamental of all the senses, by which we are enabled to take cognizance of external objects, whether for the sake of acquiring prey, or of shunning danger.

The human skin, during health, is endowed with indefinite extensibility and contractility. The elasticity of healthy human skin is so complete, that, on being pinched and drawn forth from the body, and then allowed to return, not a wrinkle, or vestige of displacement is left. In certain diseases, where the alimentary organ has lost its tone, the skin does lose its elasticity, and on the decay of the body, does fall into wrinkles; but, by the most of diseases and by privation, the most plump man is often reduced to within a little of skin and bone, without leaving a single wrinkle; nor does the skin seem to offer resistance to an expansion of the body into its former plumpness. But this elasticity of skin is not equal in all individuals, nor in the same individual at all times. As this outer surface of the body is continuous with the inner surface, and communicates with it at all parts by means of the tubular system, and derives from it a supply of vital and perspirable fluids; so the elasticity of the skin might have been, *a priori*, conjectured to be closely dependent on the condition of the digestive and respiratory surfaces within. Pathology furnishes proof

sufficient of the intimate sympathy between the elasticity of the outer surface and the tone of the inner. Even without the range of disease the degree of health, and tone, and vigour, of the digestive organ may be computed from the firmness with which the skin braces up the flesh. In proportion as the stomach, in point of digestion, is in good condition, is the skin kindly and elastic; and in proportion as the stomach, in point of appetites and passions, is in good condition, does the skin, in virtue of its elasticity, efface temporary wrinkles and re-establish habitual smoothness. Perspiration goes hand in hand with elasticity. On the one hand, in proportion as the skin is dry and husky, it has lost its elasticity; and, on the other, in proportion as the sweat is clammy, has the skin given up its elasticity: in both these extremes there is langour within. That degree of perspiration that is called insensible, and that gives the skin not a moisture but merely a kindliness to the touch, is accompanied with the best condition of the vital organs, and of course with the best condition of all the animal faculties. The bracing and invigorating effects of cold, within limits,

upon both body and mind, must have been experienced by all. As the tone of the digestive organs within, gives elasticity to the surface without, so we now find that the bracing up of the surface without, imparts additional tone and vigour to the digestive surface within. But a cold atmosphere seems, according to the experiments of Crawford, to invigorate the body, by also increasing the decomposition of air in the lungs. That the colder the medium in which an animal is placed, the darker is the veinous blood, and that perspiration, which contains less or more carbonic materials, is increased in proportion to the heat of the medium, so far countervail the increase which a cold atmosphere gives to the decomposition of air in the lungs. Whether, however, we ascribe part of the invigorating effects of a cold atmosphere, within limits, to the increased decomposition of air in the lungs, or the whole of these effects to the bracing up of the skin and of the digestive organs, the fact is certain, that the most energetic people are to be found in the temperate climates, and that even in our climate, winter is the season when we eat most, when we breathe

most, and when we are most powerful in both body and mind. But a cold atmosphere, while it braces up both body and mind, at the same time tends to reduce the dimensions of the body. The contracting effects of cold upon living bodies have been long observed. Upon this principle, a traveller, in the midst of a trackless forest, can ascertain the airths, by cutting across the trunk of a tree, of which the side that faces, if on this side of the equator, the north, is always the most condensed. The contracting effects of cold upon animals may be seen by turning our eyes to our northern little brethren. Observe how even temporary exposure to a cold wind makes the body shrink, and how warmth makes it again expand. If you suppose this cold wind to blow upon you and your descendants for a long succession of generations, you cannot withhold the imagination from wandering towards the poles for a representation of your far-distant offspring. Along with the cold, indeed, the scantiness and meagreness of the food co-operate. If the warming effects of dress, domiciles, and exercise, be taken into the calculation, it may, per-

haps, turn up that the growth of the body, other things being equal, is proportional to the temperature in which it is kept. Heat, therefore, seems to be favourable to growth, cold to be more favourable to energy.

All animals have a mean temperature, which, for health and comfort, requires to be maintained. From the pervading nature of heat, from the variety of temperature to which roaming animals are exposed, and from the ever-varying temperature of any one climate, as day and night, and summer and winter, successively revolve, the animal body required to be furnished with preventives against the operation of changes in temperature, and with a self-accommodating power to these changes. Respiration, that vital fire which is planted in every living being, must be viewed as the great source of animal heat. This fire, for the purpose of better maintaining the mean temperature, is made to burn more strongly in proportion to the coldness of the atmosphere, while, for the same end, the surface of the animal is made to take on the fine downy covering, and

the white colour, that are most retentive of heat. Even hares and rabbits in our island have their fur more copious and of finer texture in winter than in summer; and the short coarse hair of an equatorial region, by passing into a polar, is gradually changed into fine wool, and, at the same time, becomes more and more blanched. Thus in cold climates the brisk fire within, and the enclosure as much as possible of the heat without, all conduce to keep up animal warmth. On the other hand, this central fire, still for the purpose of better maintaining the mean temperature, is made to burn more slowly in proportion to the warmth of the atmosphere; while, for the same end, the surface is made to take on the dark colour, and the short crisp covering that are most diffusive of heat. The fine woolly covering of a polar climate, on passing into an equatorial, is gradually converted into short, coarse hair, and at the same time assumes darker shades. Thus, in hot climates, the moderate fire in the centre, and the free egress of heat from the surface, all conduce to keep the body down at the healthy coolness. In the article of dress, mankind should take a

lesson from Nature, and, instead of following fashion through those devious and unmeaning courses along which the desire, without the reality, of distinction ever seeks to drag her, so that, like the bat in twilight, she is seen only to evanish, should fix her down upon the great axis of utility, that she may revolve with all her garnishings as a useful, as well as an ornamental spoke in the great wheel which turns human life about. Our ideas of the beautiful seem to be all primarily founded on utility; the mere ornamental having arisen out of the vagueness of our associations. In the progress of the human mind utility is gradually raising its head through the encumbrance of ornament, and is gradually more and more coalescing with beauty. But with all these natural laws, that the colour is dark and the covering short and crisp, in proportion to the temperature of the climate, there interfere so many other countervailing laws and circumstances, that, on entering upon the computation of facts, what would otherwise have been universal laws, dwindle into general, and may even seem to crumble into anomalies. If we could look at the laws of Nature from the

cause side on which the great Author of them stands, we would see them all to be universal; but from the side on which we stand, we can see only the effects of combined causes, only the diagonals of various forces. On taking an extensive view of the colour of animals, we will find that there is a general tendency in them to assume the colour of the places which they inhabit. How this assimilation of colour is produced, must be left to Darwin and other theorists to determine. We find, also, that the animals most assimilated in colour to their habitations, are those which either depend upon vision for finding prey, or are objects of vision to more predaceous animals. In this stage of animality, the central fire is yet comparatively small, and the body to be warmed, large, so that economy of the heat is necessary; here, therefore, we find the body covered with hair, or feathers in which the colour is placed. Below this stage of animality the mean temperature varies so little from that of the surrounding medium, that little or no clothing is requisite. Above that stage of animality, in which the eye is ever searching for prey, or keeping on the

alert against danger, we find that the central fire is great in proportion to the size of the body to be heated, and that the animal strength has been refined into wisdom, which devises higher and more efficacious plans of procuring food and safety, than the deception of similarity in colour to every thing around. In the high human regions of animality, therefore, we find that the maintenance of the mean temperature is taken out of the charge of capillary envelopments, and intrusted to the skin itself, as an essential organ in the animal system; and that the more the skin takes this duty upon itself, the less separate and distinct from the parts below does it become, and the more is it drawn in, from being a mere covering, to a close participation with the functions beneath. Thus we see, that as soon as the organs themselves are able to maintain their own temperature, Nature immediately clears away all those excrescences, now rendered superfluous, which covered up the sense of touch; and by the time she is enabled thus to give scope to the sense of touch, her creatures are able to put on themselves what clothes they require; as if the great

parent Nature had put on the clothes of her children, until they became able to stand and dress themselves with their own hands. What a mighty stir this little duty of clothing our bodies has created, and of what mighty events, and changes, and revolutions, it has been either directly or indirectly productive. Dress stands second in the list of prompters to human exertion, which are food, dress, power, and fame, forming in the order in which they lie, a huge pyramid up which the human race are ever scrambling, but upon whose pointed summit there is no footing. It is worthy of remark, that Nature bedecks those animals which have little within, with gaudy ornaments and dazzling colours without; and that mankind, in dressing themselves, insensibly follow up that law. The highest in rank wield the sceptre of fashion over the world; and the highest in the court wield the sceptre over the nation. Within these large circles of influence, are enclosed series of circles enclosing other series of smaller circles, even to evanescence. Every office of influence, and every piece of wealth, gives a centre of a circle; even the man of learning has his

coarse irregular circle daubed carelessly around him. The plunging and dashing of fashion takes place in the court, whence the waves spread to the farthest limits of its dominion. The farther distant the ranks of society stand from each other, the more stationary is fashion; whereas, the nearer all ranks are to a level, the greater need is there for perpetual change, since the less distinctions of rank there really are, the more does fashion labour to make them. Those who have no other way, but dress, of distinguishing themselves, are to be seen for ever whirling about in the vortex of fashion. Even after the hair, as a retainer of heat, has been in a great measure cleared away, that general law, according to which the surface is dark in proportion to the heat of the climate, continues for a while to assist in regulating the temperature of the animal by radiation of caloric. To the Negro this assistance of radiation is necessary, even although his mean temperature is still two degrees of Fahrenheit below that of the European; for the Negro skin has not yet arrived at sufficient delicacy of texture and readiness of perspiration, for regulating the animal tempera-

ture through the changes of a native climate, much less through all the climates, and all their vicissitudes, over the face of the habitable world. Apes degenerate or die in a cold climate. Negroes grow languid and diseased in cold and moist weather, and are very liable to mortification of the toes in severe frost. Negro infants are very apt to be seized with locked jaw, on the smallest exposure to a cold current of air. Humboldt informs us, that the copper-coloured Peruvian Indian is not endued with the European "flexibility of organization" for bearing sudden change of climate; so that, on removal from his native spot, according to the barbarous law of the Mita, into a distant province, he always suffers in health, and often perishes. In consistency with all this, we find that the ape has a lower temperature, a thicker skin, and a more scanty and difficult perspiration than a Negro; and that from the Negro up to the European, there is a gradation in temperature, in delicacy of surface, and in facility of perspiration. No living being below the white of the human race, can, with impunity, traverse all climates. The white man, in virtue of his superior-

ity in corporeal and mental powers, is lord of the world, and, in virtue of his superiority in respiration, and in structure and function of skin, is able to walk over his extensive domain. The skin, then, even as a vital organ, is highly worthy of our attention; but, when we view it as an organ of touch, we take a step out of mere vitality into the precincts of intellect. Touch, although the lowest of the five senses, is the most extensive, and the most essential of them all. Even vision, the highest of the senses, would have been, without the co-operation of touch, nothing else than a gaudy picture, representative of no reality. All the other four senses are but the prompt assistants of this great fundamental—are just so many elevations, at which this sense holds levees, and takes cognizance of distant objects from their proxies. No wonder, then, that the skin became denuded, as soon as hair could be dispensed with. The human body is now covered over with the sense of touch, so that all parts can feel, without being necessarily subjected to violence;—can not only feel, but, in virtue of communication with the sensorium, can also

perceive—can supply to the mind the most substantial and correct of all the sensations out of which the immense temple of human knowledge has been reared. Although the whole clarified surface of the human body is not actively employed in feeling objects, yet the extensiveness of the clearance is the best earnest of Nature's solicitude for the furtherance of intellect, just as exuberance of progeny bespeaks her solicitude for the continuation and multiplication of the species. That the main design in clearing the skin from hair is to let out the sense of touch, appears evident from this clearance commencing in those very parts that are most frequently employed in feeling objects, and that, in the end, require and possess that sense in the most exquisite degree. Accordingly, the face and the grasping sides of the fore feet, are first denuded in apes, and are the parts in man that are the most exquisitely endowed with the sense of touch. Although the sense of touch began first to be developed in the face, yet in this very neighbourhood most remains to be done. Even in some apes, the mere face is almost

completely cleared, and in others, a small portion also of the head—the region of intellect. But the clearance of the head is a work of slow and difficult fulfilment. Here that garb of brutality, which so long overcast and shrouded up the sensitive part of the intellectual system, has taken its last stance. The exertions of the human mind are making gradual encroachments, and have already opened up a space in front, whence the mind can already command extensive propects. It is not from the brow being more suitable for the sense of touch than parts long before denuded of hair, that an open forehead is so expressive of clearness and comprehensiveness of mind; but because the very procedure, in clearing away more and more this darkening encumbrance, even although lying above, and cherishing with heat, the intellectual organ itself, is just a continuation of a work whose commencement was so well marked by a corresponding development of intellectual powers, and of a work which becomes more complicated the farther it advances; as if the increasing difficulty of promoting knowledge and improving intellect, were represent-

ed by the increasing difficulty of working a mountain as you ascend with your operations.

As the main purpose of hair on the surface of the body is to assist in maintaining animal heat, and as respiration is the source of animal heat, so hair, being assistant to respiration in one of its duties, must have some physiognomical reference to animal energy. In so far, therefore, as there is a necessity for hair over the general surface of the body, must respiration be considered inadequate of itself to maintain animal heat. Hair, therefore, while it implies a deficiency of internal radical energy, supplies that defect, and therefore lays claim to the physiognomical indication of energy. But, in supplying the defect of the respiratory organ, this excrescence has made encroachments and obstructions upon the sensitive organ of touch—has thrown a blind over a part of the moral and intellectual system—and has, therefore, given an animal stamp to its own indications. Hair, therefore, points to animal qualities, nervous papillæ to moral and intellectual. Yet although Nature is solicitous to give scope to the

sense of touch, she is not rash in completely eradicating an excrescence so indispensable to certain stages of animality, but, even in man, retains sufficient for cherishing, with more than ordinary heat, her favourite organ the brain. On taking a general view of animals, we perceive an evident effort of Nature towards a reduction of the area of hair—towards a conversion from a periodical to a perennial crop—and towards a gathering together of this durable crop over important organs, and, above all, over that great ultimatum of animal existence, the intellectual organ. In many of the lower animals, whose spinal marrow is comparatively large, and whose small brain is so well defended by cranial cells, the long hair is collected over some part, generally the most exposed, of the spinal column; whereas, in the human race, whose brains are comparatively large, the head is the distinguished seat of hair. The hair on the heads of the lower apes, scarcely exceeds in length, the hair over their bodies; but, in the higher apes, the hair is evidently longest on the head. Negroes have short curled hair. Europeans have long flowing hair. From this

gradation we are warranted to conclude that the hair, although unfavourable in proportion to the area from which it grows, is favourable in proportion to its length. Nature seems to be no farther averse to hair, than in so far as it shrouds up the sense of touch. If we draw a line of distinction between those of our race whose heads are covered with long hair, and those whose heads are covered with short, we will find the generous and complacent characters on the one side, and the irascible and turbulent on the other. Cæsar is said to have preferred, for offices about him, men with long sleek hair. If we turn our eyes to the lower tribes, we will find that those animals, whose heads are tufted with long hair, are generous and complacent. Thus the lion, notwithstanding his ferocious mode of procuring food—in which respect he is on a par with the tiger—is comparatively generous and complacent. The horse may also be instanced as a gentle and generous animal.

A gradation of hair might be made out with regard to texture. Suffice it to contrast the

dorsal bristles of the hyena, or of the wild boar, or even the coarse crisp hair on the head of a Negro, with the fine flowing silken hair of a European. The finer the texture of the hair the more feeble is the constitution; but, at the same time, the more delicate is that part of the character to which the hair points. The colour of the hair is so expressive of the constitution, as to be considered a pretty correct index of the temperament. The radical strength of man, other things being equal, is proportional to the darkness of the hair. That kind of disease which, having no outlet, is pent up within the body so as to affect its general functions, always more or less blanches the hair. Those individuals that occur here and there, in all the four quarters of the world, with skin and hair of a pure whiteness, and from that circumstance receive the name of Albinos, are always weakly and unhealthy. Indeed, for illustration, we need not go farther than ourselves and those around us. As we advance from weakly infancy, through stronger boy-hood, up to robust man-hood, the hair becomes darker and darker. As we descend the other side of the

hill of life, the hair again becomes whiter and whiter, and the body feebler and feebler, until we reach the bottom of the hill, bending and tottering with our hoary heads on the brink of the grave. Feebleness of body, however, is not the sole blancher of the hair;—anxiety and grief are powerful coadjutors: grief has been known to whiten the hair in a night. That grey hairs are to be found along with youth and strength, and black hairs along with imbecility, are exceptions necessary to render the rule general. We have purposely refrained taking more, in this place, than a partial view of hair, as an object of physiognomical inquiry.

How the various complexions of the human skin have been produced, is a question that has stirred up a keen controversy. One party argues that climate alone is sufficient, in the course of ages, to have brought about all the present variety of complexion, and that man came out white from the hands of his Creator. Another party argues that exposure to a warm sun merely tinges the surface—that every new

offspring is born as white as its earliest progenitors, and continues so until after similar exposure—that any radical change on complexion, after removal from one climate to another, is produced by intermarriage with the natives, and that there had been originally different races of men. There is also a third party, that is desirous of compounding the matter. But climate must either have, or not have, a radical effect on the human complexion. The darkening effect of a vertical sun on a Briton, with every advantage of clothes, and shades, and shelters, within the short space of a few years, is a strong presumption in favour of the affirmative. But again, the undiminished whiteness of his offspring, after many successive generations, under the same vertical sun, the clarifying or bleaching effect of a cold or temperate climate upon his own dun surface, while the coldest climate makes not the least impression on the colour of the Negro, and above all, that fact observed by Humboldt, that the covered parts in half naked Indians, do not differ in colour from the parts exposed, all go to constitute a powerful presumption in favour of the negative. But as

Nature, in producing radical changes upon her works, does not limit herself to time, which, like space, lies before her in one boundless ocean, although it comes to us in the shape of spray and currents from amongst the wheels of her machinery, so no conclusion can be drawn from how many soever observations on a few stragglers who have left their native climate. We must therefore take a comparative view of the permanent inhabitants of the several climates scattered over the face of the globe. In the prosecution of this task we are interrupted at every step by perplexing discrepances, and sometimes by open and irreconcilable opposition between climate and complexion. We must therefore look out for some better cause of complexion than climate. As complexion in human society has a great influence in regulating marriages, so intermarriage seems to have, in turn, a great sway over complexion. Here we have got within the region of experiment, and may fancy ourselves within the laboratory mixing colours together. A white with a black gives a mulatto, whose colour is intermediate between black and white. A white with a mulatto gives a

guadroon, whose colour is intermediate between the mulatto and the white. A white with a guadroon gives a mastize, whose complexion is little darker than that of a deeply sunburned Briton. A white with a mastize gives a complexion that ranks with the white. On the other hand, a black with a mulatto gives a samboe, whose colour is intermediate between the mulatto and the black. A black with a samboe gives an offspring still darker, which, with a black, gives a complexion that can scarcely be distinguished from the original black. There are instances where the complexion of the one or of the other parent has predominated, but the general result of intermarriage between people of different colours, has been the intermediate shade. But although the white colour of a European, by intermixing with the Negroes, becomes apparently evanescent about the fourth generation, yet arithmetic tells us, that all the descendants from this European shall continue to have a tinge of the whiteness, however slight and undiscernible, to the most distant posterity. Thus we see that Nature is unwilling to allow the slightest shade of improv-

ed animality to pass out of the world. Nay, she is willing to turn that great object, which her unwearied laws have been gradually bringing about, to the greatest account, by taking every possible guarantee, physical as well as moral, for the permanence and promotion of intellect. Wherefore, on finding that climate has been inadequate to produce these radical distinctions of complexion, and that intermarriage, instead of producing or even maintaining, has been, so far as its operation extended, busily destroying them, we are necessarily led to trace them to a more remote origin.

As every change of complexion is generally accompanied with a corresponding change of feature—as the issue of a negro with a white has not only an intermediate complexion, but also an intermediate head, intermediate features and intermediate abilities—as human history furnishes us with no period when our race was either all black or all white, or when there was a less complete gradation than the present, from the one extreme to the other—and as we find, not only in the musty pages

of history, but also in our own observation of the face of the world, after every succeeding year and series of years, that mankind are fast improving, so we are warranted to conclude that the human skin and abilities have gradually become brightened up together. The truth seems to be, that the white colour is a quality of skin that belongs to superiority in organization, so that a change of skin, from black to white, stands in the same light with a change from Negro to European features. As a body subjected to heat becomes darker and darker, and at length black, so, in ascending through the tribes of apes up the scale of animality, you pass through various colours, until at length you land amongst the negroes. As the black charcoal, on being further exposed to heat, becomes by and by red, and ultimately white, so from the stage of negro, as from the starting point of humanity, every individual, as he arrives, having received within him a spark from the divine altar of reason, is driven forth on a new and elevated route which he must pursue, for the purpose of fanning that spark into a moral and intellectual fire, that in spite of all

the darkening rays of the sun from without, shall brighten up the whole corporeal system, by extending an improved and a more efficient organization from centre to circumference.

Along with the variety of complexion in the human race there is an accompanying variety of constitution. The ancient distinction of all the innumerable human constitutions into four temperaments, according as one or other of the four chemical elements predominated—into choleric, in which heat, into phlegmatic, in which humidity, into sanguine, in which air, and into melancholic, in which earth, respectively predominated over the other three elements in the chemical composition of the body —a distinction, in those ancient times so prepossessing from the sublimity of that science, though rude and incipient, upon which it rested; so decoying from the air of simplicity with which it was surrounded, and so convenient from the latitude which it allowed to practical application, had gradually so intricately and closely entwined its roots throughout all the physical history of man, as, having left the origi-

nal accompaniment of rude chemistry centuries behind, to have come down to the present day, with all the parade of an independent, and all the dogmatical asseveration of an incontrovertible, doctrine. But as the four terms into which all human constitutions are classified resolve themselves, when stripped of chemical allusion, into four arbitrary assemblages or groups of qualities—into four arbitrary or assumed characters, which humbler and more ordinary words might better convey to every apprehension—so we must either keep rate with advancing chemistry, and now almost double the notable list of temperaments drawn up by Lavater from the chemistry of his day; the "oily," the "mercurial," the "etherial," the electrical, the magnetical, the frigorific, the carbonic, the nitrous, the "bituminous, the resinous, the glutinous, the milky, the gelatinous, the buttery or greasy, the cheesy, the soapy, the waxy," and so on—or lay chemistry aside, with all its terms, as inapplicable to a science whose real object is to compare organization with function. It is worthy of remark, that the very same science of chemistry, which, in its rudest

form, pretended to explain every thing regarding the human body, has now, notwithstanding all its present splendour and magnificence, given up all pretensions to the least insight into the mysterious affairs of the animal economy, and has acknowledged that all her chemical experiments and discoveries have been hitherto set at nought, and thrown aside, like so many tricks of jugglers, into the corner of insignificance, by the wonderful, though silent, functions of the animal economy. But although the human temperament, by throwing off all allegiance to chemistry, such as we have it, gives a refutation of the ancient chemical doctrine of the temperaments; yet it must be granted, that men are to be found possessing the qualities attached to each of the four temperaments. No matter what the generic terms are, their definitions point to the men; and it is the more necessary that the definitions should be taken in accompaniment with the generic terms, since almost every author gives a different definition of the same temperament. If Lavater describes to us a character that "ever aims at rising," that is "fearless of danger," that "takes a daring

flight," we at once understand what the physiognomist means; but if, instead of all this, he had simply said, a man of "the choleric temperament," there is not perhaps an individual on earth to whom that term would have suggested an assemblage of the above qualities. The man that "digs, explores to the bottom," "loves the solid, and cleaves to it," the most vague imagination could scarcely have pictured out to itself as a specimen of the melancholic temperament. Nor could launching "into a distant region," and being "lost in endless wandering," signify the "sanguine" temperament—any more than the never thinking "of rising, nor sinking, nor of distant prospects," the attempting "only what he can obtain," the making "choice of the shortest road in perambulating," and the seldom making "one step beyond the absolutely necessary," can signify the phlegmatic. The temperaments, according to these wide definitions, would constitute, of themselves, a little system of physiognomy. The truth indeed seems to be, that the temperament has been computed, not from the chemical composition, or from the texture, but

from the general shape, and size, and complexion of the human body, and might almost be held as a summary of the whole complicated physiognomy of the individual. Temperament, if it means any thing, or is to be held as a distinct thing, must refer to the complexion, together with the accompanying texture of the human body, and must form a gradation from the coarse and black surface of the Negro, up to the fine white surface of the fairest European. Between these extreme points we have not a regular gradation in size and shape, keeping regular pace with colour and texture, but a jumble or medley of all colours and textures, with almost all sizes and configurations. It has been this variety of character found in the same complexion and texture, that has thrown the doctrine of the temperaments into all this comprehensive vagueness. The darker the complexion and the coarser the texture, the stronger is the bodily structure. Here Nature seems to set limits upon the refinement of the bodily structure, by either carrying it into imbecility, and thus producing a dependence for execution of plans upon the coarser materials of our race,

for wisdom of itself is not power; or by making a direct intermixture with the robust below, and thus securing, in every individual of the progeny, both the ability to plan, and the power to execute. The temperament best adapted to our climate, seems to be what is generally described under the title of sanguine, in which, as the term bespeaks, there is a vigorous circulation of blood, and, consequently, of all the other subordinate fluids; in which also the complexion is florid, the countenance animated, and the hair of a red, flaxen, or chesnut colour. Here the flow of animal spirits is brisk and equable. What has been described under the title of phlegmatic, pituitary, or lymphatic temperament, seems to be a morbid condition of the sanguine, and is characterized by a soft doughiness of the whole surface, evidently dependent upon a want of contractility in the skin; by sallow complexion, want of expression, and languor of both bodily and mental functions, evidently dependent upon the relaxed and languid state of the digestive organ, and by light coloured hair. What is generally understood by the choleric temperament is a

being of coarse fabric and violent passions. Here the flow of animal spirits is interrupted and irregular, and ever tending to the impetuous. By the bilious or melancholic temperament are generally understood black hair, firm and swarthy brown skin with large cutaneous veins, great energy, and strong passions. This is the constitution which possesses the robustness of the Negro in the most suitable combination with the delicacy of the European. This constitution seems to be adapted to a warm climate, in which it would have performed its round with little more than ordinary ceremony. But in temperate or cold climates, the profuse secretion of vital energy—more profuse than in warmer climates, and yet exposed to less causes of expenditure—leads to accumulations of excitability, which must either induce morbid susceptibility of impression, or get vent in great enterprises. No doubt the constitution does gradually become more and more accommodated to the climate in which it is situated, the vibrations of the pendulum do gradually diminish, and would ultimately disappear, but by this time age has begun to work changes which

confound all distinctions into temperaments. As in the moral constitution of man economy is a necessary preliminary step to wealth and power, so in the physical constitution saving and gathering is necessary to the acquirement of that degree of energy which enables a man to step beyond his fellows in enterprise. The bilious or melancholic temperament is an intermittent constitution labouring under an interminable succession of healthy paroxysms, the calmness of the intermission being a sure premonition of the violence of the paroxysm; just like the stemmed-up current which remains quiet only until it has gathered strength to bear down every opposing bank and barrier. To this temperament almost all the great men may be traced. From this temperament start forth the generals in the great army of mankind, to lead them on to the arduous struggle of contending passions and interests. But, as if Nature studied equality in the bestowal of her gifts, there is implanted in this wonderful temperament a strong predisposition to insanity. He oversteps all the low grovelling laws of necessity by which the bulk of mankind are

urged to crawl their little rounds, and, by the enticements of ambition, is led on with wide adventurous strides upon great and bold undertakings in pursuit of wealth, power, and fame; undertakings that, although selfish, involve the interests of the human race. While the phlegmatic temperament resembles the stagnant water of a morass; while the choleric resembles the precipitous rivulet, rushing, so long as it lasts, furiously down in cascades, cataracts, and torrents; while the sanguine resembles the deep river, which is ever flowing, ever full, and ever regular, the melancholic temperament resembles the ocean;—both have their ebbings and flowings, their neap and spring tides. While the circumstances of life blow a brisk regular gale, the voyage is prosperous and promising. Even when they blow a high wind, the surface is just roused into swelling waves, over which the great fleet of virtues is wafted, in full sail, under the skilful pilot of prudence; but a dead calm is just a prelude to a furious tempest, that shall either give a speedy voyage, or make shipwreck of both fleet and pilot.

We have now considered the two great vital functions, alimentary and respiratory, by which life is maintained, and the circumstances by which these functions are influenced. Life is not a spirit floating loosely among the organs, but is the perpetual produce of the vital manufactory within, where Nature herself is the assiduous and indefatigable operator. All the labour that, in the great work of the animal economy, is devolved upon man, amounts to little more then supplying food and breath. The laborious part of his task is soon over, and then he may loll at ease, or frisk in sportfulness. But the work which Nature performs behind the scenes, within the body, underneath the animal envelopment, is complicated and incessant from the earliest germ of existence to the final gasp. Is it too much for this great author of us all to demand exertion from us, when it is by the unceasing operations of Nature within every mortal of us, that we either have, or are conscious of having, an existence? The contrast between the occasional, and tardy, and unwilling, and limited nature of our ostensible performances without, and the

incessant and extensive, though silent operations of Nature within, by which the whole receives size, and shape, and animation, affords a text rich with moral and religious instruction.

PATHOLOGY.

As, for the purpose of getting a correct view of physiology, we had to simplify the functions by reducing them to three radical, which are sufficient for maintaining and transmitting life of the simplest kind; so now, for the purpose of taking a correct view of pathology, we must take the three radical vital functions, in all their complication, such as we find them in the human body, maintaining and transmitting life of the highest order. As a human being never appears so amiable, and as the most amiable part of our race never appear so graceful, as at the side of a sick bed in the act of administering relief and comfort to suffering humanity; so the never-ceasing benevolence of Nature is more than ordinarily conspicuous, by being more than ordinarily called

forth in disease. Physiology is calculated to inspire a religious mind with reverence; but pathology, when rightly viewed, is calculated to awaken the deepest gratitude and the warmest love. While pathology is the finest display of divine beneficence,—while all the pathognomonic symptoms are just so many efforts of the *vis medicatrix Naturæ* towards expulsion of disease, this very disease, which Nature is so strenuously engaged in rectifying, proceeds from human error,—from error in the duty of self-preservation, and from error in the duty of preservation of the species; the only two duties with which man is intrusted. Errors in the former duty produce that kind of disease which operates all its mischief on the individual. Excess in the other duty, when effective, produces, in consequence of over-population, epidemic diseases; and, when ineffective, produces a well known disease, which, from its tendency to spread from one individual to another, seems to partake of the nature of epidemic, and which, from its fatal tendency, where medicine is not interposed, would effectually reduce that over-population which lays the restraints upon marriages, and

would accomplish that reduction in the most equitable way by sparing the virtuous. Disease may therefore be viewed as the rod with which the Universal Parent punishes the delinquencies of his children. Although the patient may not be aware of the error that caused the disease, or may plead ignorance of what was error and of what was its punishment, yet *ignorantia non excusat culpam* is written on the penal code of Nature as well as of man. Ignorance of duty is indeed itself a fault. The diseases that follow errors are so many partial proofs and premonitions of the great verdict Death pronounced against Sin.

But disease, although it is, on the small scale in relation to man, punishment for human error immediate or remote, yet is, on the large scale in relation to Nature herself, the plan by which she regulates population—that high and important part of her extensive and beautiful economy, by which she balances the sum of life with the means of support. Thus Nature does not inflict punishment for its own sake, but merely administers a little chastisement on

individuals, while she is engaged, on the great scale, with arrangements for the happiness and prosperity of the whole.

The various parts which constitute the living machine are not set, like those of the automaton, upon precarious pivots, nor do the wheels of the animal machine revolve upon their invariable axes with one reciprocity of rotation. There is a considerable latitude given to functions, that they may be able to meet and surmount contingencies; but when the deviations extend beyond the bounds of that wide latitude, then the machinery is driven awry—disease does ensue, of which the very first warning we generally receive is some great struggle of Nature to remedy the evil. Here the duty of the human physician is to keep the whole functions in a condition as near the healthy as he can, and to leave the rest to the Great Physician. Medical men ought, like Hippocrates, to stand by for a little and look on,—first to investigate the disease, and then to inquire whether they should at all interfere. The medical science seems to be fast degenerating into quackery; the

grave thoughtful physician has sunk into the busy surgeon with his instruments, and into the smart apothecary with his apron; and operations and doses are, without limit and without discrimination, the ruling order of the present day. The human body is a self-rectifying machine, which requires little more at our hands than obedience to its dictates, and scope for its own operations. The encouragement given to ignorant drug venders, both licensed and unlicensed, although it does incalculable hurt not only to the deluded dupes, but also to the medical profession, is yet its finest eulogium. That medicine might not interrupt the final cause of disease, medicines are constituted poisonous. How nice and how difficult then must the medical profession be, when we are thus necessitated to expel one poison out of the body by the introduction of another? In order to understand pathology aright, we must first make ourselves masters of physiology; for the real cause of so much absurdity in medical theories has been ignorance of physiology. Before we can understand the nature of disease, we must first understand the

nature of health, from which disease is a deviation. We must not only attend to all the functions individually, but must also examine and scrutinize the relations that subsist between them, until we come to see all the various organs of the body go to constitute one single great organ. Then will we rightly understand the mechanism of the human body, and be able to say where, and how, and why, the machinery has gone wrong, and what shall put it right, before we think of lifting a tool. Then, instead of prescribing the antispasmodic for the spasm, the anodyne for the pain, and for every occurring symptom its respective antidote, the guardian of health, like the guardians of life and property, instead of thus stopping, with a palliative, the mouth of every crying symptom, summons them all before him, deliberately hears their evidence, and rids them of the lurking culprit.

As all the changes that take place, both in the moral and natural world, are for the most part gradual, and as both the human mind and body are endowed, in the highest degree,

with the power of accommodating themselves to gradual changes, so, in our inquiry into the origin of disease, we must entirely lose sight of all the ups and downs of the moral world, and of all the heats and colds of the physical. All these gradual changes, that act upon the mind and body from without, merely produce their temporary effects of happiness or misery, of sweat or shivering, but cannot excite, in the completely healthy constitution, the slightest morbid action. The only two things, therefore, to which we can look for the production of disease, are the materials which we receive into the body for the purpose of keeping up vitality. Our aliment, and our breath, are the two great sources whence we derive our diseases as well as our sustenance.

An immense catalogue of ailments may be traced to our meat and drink as the great radical source, and to moral and physical circumstances as exciting causes. For this purpose, we must follow the course of the aliment, from the stomach and bowels which are the fountain, through the absorbents which are the rivulets,

to the sanguiferous system, which is the reservoir. But we must not stop here; for there is not merely a direct stream from the fountain to the reservoir, but also a multitude of regurgitations from the reservoir back again to the fountain. This is a circulation which not only connects the digestive organs with all the other organs of the body, but which, by rendering them all mutually and reciprocally dependent on each other, unites them into a single organ. It is to this circulation, more than to the sanguineous and nervous circulations, that we are to look for the development of the mysteries of pathology, and for an explanation of all the metastases, and sympathies, and crises, of disease. This is the great circulation which circumvolves all the other circulations in the body, and embraces within its sweep nothing less than a summary of all that cluster of organs which compose the animal, and of all that concatenated assemblage of functions which constitute physical, moral, and intellectual life.

The absorbent and circulating vessels, although they are capable of contraction and ex-

pansion, may yet be compared to a complex hydraulic tube, into one end of which no liquid can be introduced without an equal discharge from the other; for the laws of hydraulics must obtain in living membranous tubes as well as in dead vitreous. Plenitude of the tubular system must, therefore, to a certain degree, forbid the farther absorption of chyle, and all the contents of the smaller bowels ought forthwith to descend as offal into the larger. Here then is an excretory outlet, by which all superfluity might be carried off, before entering at all into the absorbent and circulating system. Were this excretion at all times in the full performance of duty, the stomach and small intestines would be emptied before every new meal, the board would be cleared as soon as the feast was over, and hunger and satiety would measure the food accurately to the requisitions of the body, and thus disease would be almost precluded. But the savoury, and rich, and plentiful food, along with the small exercise, soon overthrow hunger and satiety, and lead to accumulations and stagnations, by which the alimentary functions become impaired, the intestinal secretions

vitiated, and the blood rendered impure. As all the functions of the body have a more close and immediate dependence upon the sanguiferous, than upon the alimentary system, so Nature has established direct excretions from the blood, and is ready at all times, when life stands in danger, to break up artificial drains from any part of the body, and even secretions have, for the expulsion of a disease, been for a time converted into excretions. All this explains why wounds heal soonest in people of easy tempers. That diseased condition of body which produces the fractious temper, retards the healing of sores; for the impure blood is rather on the verge of throwing open a new drain, than disposed to allow one, timously thrown open by accident, to close up.

As the alimentary organ is the seat of all those animal appetites and passions which incite us to the pursuit after the necessaries and comforts of life, and as the brain is the director of that foraging troop of organs, whose office it is to supply all those necessaries and comforts, so there exists a consent in function, and a pro-

portion in power, between the alimentary organ and the animal faculties. The stomach then presents itself as first in order of the vital organs, and as the grand *primum mobile* of the animal faculties. Let us now take a stout healthy man, and confine him to a sedentary life. In constituting his alimentary organ so vigorous, in implanting in it appetites so violent, and in surrounding it with faculties so powerful, Nature has calculated upon great bodily and mental exercise. This necessary exercise being awanting, without even a corresponding diminution of food, the digestive powers soon fall short of the task imposed upon them. Were the ingesta to overbalance the digestive powers only once, or even occasionally, such a stomach might soon recover itself; but the overbalance is habitual, and the necessity of a perpetual struggle is imposed upon the stomach, so that a clearance can never be accomplished, nor a respite obtained. But this is not the sum of the evil, for whenever digestion stops, then chemistry commences; so that instead of a nice galvanic apparatus of digestion, we have often a putrifying slough, or a fermenting vat—

we have pneumatics intermixing with hydraulics. Still, in such a constitution as we have supposed, the stomach struggles on, and refuses to the last to give way, and to involve the other organs. But as the stomach is the first in the chain of vital organs, and is not only the fountain from which itself and all the other organs derive nourishment, but also transmits to them the very materials upon which they must exercise their respective functions—as, in short, all the other organs hang, as it were, from the stomach, so, in spite of all its efforts, they come to participate in the evil. As long as the stomach manages to withstand, we have that Proteus disease termed dyspepsia, rising, according to circumstances, into hysteria and hypochondriasis. Here rank up all the diseases vulgarly called nervous.

If the morbific materials from the stomach find their way into the mass of blood, and from whatever cause cannot get exit through any of the excretions, then Nature sets about making an artificial drain, by the process of inflammation, followed by suppuration, or other effusion.

This struggle of Nature to break up an artificial drain constitutes the long catalogue of inflammatory diseases. In fixing upon a spot for the drain, Nature seems to grope in the dark, and to choose the organ that most readily gives way. Although she is of herself too often inadequate to accomplish expulsion of the disease, and afterwards reparation of the local affection, especially if situated in an important organ, yet her efforts are not to be the less appreciated, nor is our co-operation with the lancet to be overrated—to be considered as at all a part of the process of cure—but merely as affording scope to her great operations. But Nature does not exert herself to the same degree in every constitution. Her exertions for the expulsion of disease are always proportional to the vigour of the functions at large. In the sanguineous temperament she makes very energetic struggles, and rather than yield to the disease will make a sacrifice of the individual. Whereas, in the phlegmatic temperament, she readily makes a surrender upon the mere grant of life.

These two sets of disease, the one confined to the stomach and bowels, the other transmitted into the blood, comprehend the bulk of ailments which a vigorous constitution can derive from the materials received into the alimentary organ. But when we descend to constitutions whose organs are feeble, then we have disease at once bursting the bounds of the stomach, affecting and obstructing the very absorbent system, which conducts from the alimentary tube to the blood, and rendering the volume of blood a mass of impurity. In such constitutions the process of inflammation, to which nature even here has recourse as the only alternative, is languid and tedious; and the callous edges of the abscesses and fistulæ come to resemble the half animated flesh of amphibious animals. But to enter into the minute detail of cachectic obstructions, indurations, tumefactions, and vitiations, which may be traced to the quantity and quality of food and drink, amongst a set of weak unresisting organs, is altogether foreign to the present cursory view of pathology.

The diseases that derive their origin from the materials received into the alimentary organ are limited to individuals, and terminate with the victims. But the diseases which enter the system along with the breath, act on a larger scale—have their dealings with communities. These are the diseases chiefly by which population is regulated.

Although we remarked that moral and physical changes, acting upon the mind and body from without, are inadequate to produce disease in a sound and healthy constitution, yet we must grant, that the slightest moral or physical cause operating from without, upon a person whose vital functions are already deranged within, is sufficient to set agoing the most complete train of morbid action. But here the external cause is merely auxiliary to the internal, and would have been by itself unavailing. It cannot in the present day be too much insisted upon, that an animal is a self-rectifying machine, and especially that, when sound within, it is completely repulsive of every invasion from without. As the British nation

has been able, and is yet able, to repel every foreign attack, so a healthy constitution is able to repel every external cause of disease; but as a civil war breaking out in the vitals of the British nation might soon render her conquerable by the most paltry power in Europe, so it is only after internal discord or derangement among the vital organs that an external moral, or an external physical cause can overcome a good constitution, and drive it headlong into the bed of sickness. It is on this account that all who are placed under similar circumstances, are not equally liable to disease. Here it may not be irrelevant to remark, that ere society arrives at that stage in which contagious disease prevails, the vital organs of the generality of the inhabitants have become, by corrupt modes of life, enfeebled, and have in consequence lost, in a great measure, that spring or elasticity by which contagion can be warded off; contagion therefore is not introduced until there is a field upon which it can operate. Before Nature brings forward the invaders, she has already sapped the fortification; for here a conquest

must be gained,—here the few must be sacrificed to the happiness and prosperity of the many.

It is a maxim in political economy, that no more people can live in the world, or in any part of it, than there is food to support. In rude states of society, redundant population is swept off by actual starvation. Here hunger is the great stimulus to exertion. But in the more advanced stages of society, animal exertion and improvement are taken out of the charge of the gross appetite, and transferred to more intellectual incentives. Here, therefore, needless starvation is precluded, and the superfluous visitors are politely dismissed, without being told that there is no food for them. The Great Physician of nature takes care, in the first place, that the disease of overpopulation shall not spread. This is immediately effected by the restraints which arise to marriage. A dose of contagious epidemic is then administered, which, passing through all the tortuous windings of life, purges off the refuse; for where no interference is given,

a contagious disease carries off the weak and the decrepid, while the robust and shapely pass through more purified than before. In the performance of this gloomy but necessary work, glimpses of divine benevolence may be discerned, not only in the ultimate design of the work, but also in the mode of the performance. Contagious diseases are febrile; in other words, have their primary seat in the brain; so that the patients are comparatively insensible of their misery. Had contagious diseases carried off all indiscriminately, old as well as young, the parent as readily as the child, to what sum might not human misery have amounted? The death of a child is only the removal of an unproductive eater, but the death of parents is not only a loss of useful members, but also throws a burthen of unproductive eaters on the back of society. Nature therefore has so ordered matters, that contagious diseases shall attack and carry off the young almost exclusively. For this purpose these diseases are allowed to attack a person only once in a life-time; so that parents have for the most part undergone a prophylactic.

Moreover, these diseases are inflammatory, to which kind of disease the vascular bodies of children are peculiarly conducive. That contagious disease shall most certainly and effectually accomplish its purpose of thinning society, respiration itself is the medium of communication, and thus the blow is struck at the very centre of life. This kind of disease seems to be generated by too much respiration for a length of time in a given quantity of air. Here nature does not wait till the whole atmosphere shall be polluted; but, whenever too much breathing takes place in any part of the atmosphere, then she infers that overpopulation is general, and nips the evil in the bud, by sending forth a contagious epidemic. By ordaining that too much breathing for a length of time in a given volume of air shall generate contagion, nature shows her aversion to too much crowding together of her creatures; and, in the strongest of language, commands them to spread over the surface of that earth which was given them for cultivation. By obeying this order, two grand ends are gained at once, either of which, without the other,

must always be insufficient for human welfare,—an increase of food and population, and an atmosphere fit, in all its extent, for respiration.

The lungs then are the avenue by which contagious disease enters the system. By this same avenue do effluvia, generated not by a living body, but by dead materials, enter the system, and produce that kind of febrile disease that spends all its mischief on the individual, but yet is epidemic from the extensiveness of the cause. This species of disease may be viewed as a punishment from the divine hand for neglecting agriculture, which is not only absolutely necessary to our very existence as living beings, but is also necessary to our comfort, by preventing the surface of the earth from becoming a nuisance, as well as a source of morbific miasmata. Nature shows a marked opposition to any part of her materials remaining idle. The more we place the materials of Nature in a productive attitude, the more pleasant, and healthsome, and useful, do they become. On the contrary, the richer the ma-

terials—viewing them with the eye of Nature, as rising into higher and higher life—and the more they are placed in an unproductive attitude, the more unpleasant and baneful are the consequences; no matter in what unproductive situation these nutritive materials are lodged, whether within the body, or without the body, or in collections on the earth. It is a common remark, that God never sends a mouth into the world without food; the converse is perhaps the truer of the two, God never sends food without a mouth. Accordingly every accumulation or stagnation of filth, if not timously spread on the ground for the nourishment of useful vegetables, is soon in motion with animal life: accordingly also, filth, allowed to gather on the surface of the body, is soon productive, or rather attractive, of insects, which, to render uncleanliness the more odious, are communicable from one person to another by contact; accordingly also, filth, allowed to accumulate in the bowels, becomes food to worms, if they can possibly reach it. Filth, whether on the earth, or on the body, or in the body, and whether accessible as food to living creatures,

or left to the guidance of chemical laws, is productive of inconvenience and disease. When the ingenuity and industry of man shall have brought all the nutritive materials on the surface of the earth into the most productive condition, then we shall have driven from amongst us all the physical causes of disease; and as moral improvement always accompanies physical, so, along with this extirpation of physical, we will also have a removal of all moral—in short, of all possible causes of disease. This is not a chimerical prospect: many are the individuals around us, who have never felt disease. If a single individual has passed through life to old age, and to the grave, without a gripe and without a pang, where lies the impossibility, where the improbability, and, when the progressive state of mankind is considered, what hinders the certainty, that the whole race shall ultimately become impregnable to disease, and that human life shall be allowed to spring, to ripen, and to decay, in the mere course of nature.

We have already viewed all those diseases

which originate from physical causes. We must now take a higher view of disease than as a mere mechanical or chemical intruder amongst the vital organs. We must view it taking its high and stately entrance through the porch of the mind. For this purpose we must lift our eyes from a close inspection of man as a mere cluster of organs performing vital and animal functions, and behold him from a proper distance performing his evolutions as a moral being in this life militant. As in the great animal world, so also in the human part of it, there is variety of ranks for the purpose of filling up all the interstices of society. The breadth or extent of human society has been ensured by strong laws which never fail; but the height, so to speak, of human society, is intrusted to human exertion. The great struggle among mankind, after having procured the necessaries of life, is to arrive at a moral or intellectual height; and, to assist our exertions, Nature has thrown us into bundles over the face of the earth, that we may mount up on one another's shoulders, in order to reach happiness, which seems to be hung up over our heads as a bait,

at which we still renew the delusive grasp, as the child stretches out its arms to lay hold of the moon. Thus human society over the face of the earth appears, to the eye of philosophy, in the shape of immense pyramids. This desire and struggle after happiness is just the wise *modus operandi* of Nature for the ultimate production of mental improvement, just as hunger is a better security than argument for the nourishment and growth of the body. In this struggle through life, the bulk of mankind are passive beings, remaining inert until they are impelled by necessity. Very different is it with the man of strong passions and high talents. In his career through life he is pursued by necessity, and drawn forward, as much as possible, out of its reach by ambition: he has public opinion marching along with him on the right hand, the law with all its scales of justice and instruments of punishment on the left, and conscience in the centre. With all this retinue he marches on towards wealth, power, and fame, which lie in prospect; but should the prospect lour and become dim, he then begins to lag—he loses his object and his direction—ne-

cessity now comes up with his whip behind, wanton ambition still leads on before, until at length the poor wretch, in the wildness of distraction and desperation, turns about to the right and to the left in grim defiance of men and laws. To the difficulties and disappointments attendant upon a struggle in which there are so many competitors, and where the object is superiority, must be ascribed the frequent occurrence of insanity. But we would be taking a most erroneous view of this disease, were we to content ourselves with the sufficiency of these exciting causes, operating upon what is called mind. The human mind is possessed of a great latitude of accommodating itself to circumstances, so that as long as the bodily organs continue healthy and sound, difficulties merely stir up exertion, and misfortunes merely produce temporary concern. It is in virtue of the intimate sympathy between the mind and the body, or between the functions of the brain and of the vital organs, of which the stomach is at the head, that the difficulties and misfortunes of life engender insanity. How the human mind can at no time become concerned

or anxious, without impairing digestion, and banishing sleep—how impaired digestion lays restraints upon all the other functions—how they in turn react upon digestion—how the whole functions, vital and animal, become more and more deteriorated as long as the exciting causes continue, until the mind, from amongst the dangerous rocks, and quicksands, and eddies, through which prudence still endeavours to pilot her, at length launches forth into the wide sea of insanity, to be driven about without a helm, and without a compass, must all be taken into the account before this multiform disease can be understood, or the manner and difficulty of curing it be believed. As the intellectual organ is not a distinct and independent thing, but is literally an animal organ, and derives its nourishment in common with the lowest organs in the body, so every bodily disease must less or more affect the intellect, and some may even go the length of producing a settled mental disease. On the other hand, as all the organs of the body form an indissoluble whole out of which the brain could not be lifted fairly by the roots, without tearing asunder every organ

and every portion of organ in the body, and if lifted out would leave a gap that no surgical dexterity could close up, and shreds that no mechanical skill could put together, so the difficulties and distresses of this intellectual organ, in its arduous duty of foraging for the rest, must tell upon every portion of the subordinate machinery. If the difficulties and disappointments with which this organ has to encounter, were to rouse the other organs to increased action, and if that habit of body which is liable to insanity, had been weak and ready to give way by bursting into some sympathetic discharge, then we would have had this disease performing, like the most of diseases, its little parabola, and perhaps leaving the body better than before. But these mental difficulties and disappointments lay restraints upon organs that are, from their native vigour, little liable to give way; so that noxious materials, whose escape is necessary to health, are pent up within the system; and, by performing their never ceasing rounds in the circulation, are allowed to give mechanical and chemical fretting to a brain that is already morally distempered, and that, from

its large size in such patients, presents a great surface to the circulating fluid. If this was the whole view of the matter, there would be no hope of spontaneous recovery: on the contrary, there would be a gradual but steady advancement to idiocy and death. But when this morbid action and reaction go a certain length, then the anxious exhausted mind, after fighting through storms of difficulties, and seas of danger, at length glides into the calm haven of stupor, or is stuck fast on the sand-bank of melancholy, to sit brooding over some one calamity, upon which the mind is rivetted with a kind of gloomy fondness, to the exclusion of all other miseries and discomforts, or is cast away upon the wilderness of mania, to roam idly about without a road and without an object. While the mind itself is getting these respites, all the vital functions, now somewhat liberated from the shackles imposed upon them by anxiety, are gradually coming round to their wonted strength and action, until at length they all cooperate in thrusting every morbid accumulation out of the system, in some great critical discharge, generally alvine. As long as the

mind continues sane, anxiety produces stomachic ailments, and they in turn increase anxiety; but, in general, no sooner does the mind fairly glide into the anchorage of insanity than a calm pervades the whole vital organs. Thus we see that Nature institutes both a moral, and a physical treatment. Her moral treatment consists in bringing the mind, as much as possible, into a state resembling intoxication, by which the feelings are blunted, and the whole code of plaguy prudential rules set adrift; so that the loose faculties of a distempered mind sit in ghastly pageantry as their own umpire. Her physical treatment consists in first closing up the body until there is sufficient accumulation for stimulating the organs to a critical discharge. This is the only mode of extraordinary evacuation which nature possesses. The anxiety first closes up the body; this closing up of the body gives respite to the mental feelings; this respite gives scope to the vital organs to effect a clearance of the body, and, as if a kind of regeneration had been accomplished, to turn over a new leaf to the mind. Walking after the sure footsteps of Nature,

we adopt the soothing moral treatment; while, without waiting for the stimulus of accumulations, we set about a process of clearance by dint of medicine. By bringing the great primary wheel of the machine into brisk movement, all the obstructions that may have gathered there, or in any part of the subordinate machinery, shall be gradually cleared away; while the digestive powers are in the mean time upheld. By this mode of treatment insanity may be, and has been cured, as shall be stated at large in an appropriate place; but what I am presently desirous of holding forth, is the prevention of insanity by the timous interposition of purgation. In this way the restraining effects of anxiety upon the secretions and excretions, the impairing effects upon digestion, and the perpetual wakefulness of the animal organs, may be resisted—the functions of the body may in short be sustained, and soothing sleep procured, until the mind shall accommodate itself to that calamity, real or imaginary, which would have otherwise set it adrift. By this plan of management the human mind may not only be kept from sinking under the pressure of mise-

ries into the gulf of insanity, but may be actually brightened up into keener discernment; and, as if by diminution of specific gravity, may be made to rise into the higher regions of intellect. This is the only true way of clarifying the mind. Many stimulants do increase the intellectual powers, but overcast while they increase, as if the brain became enveloped in its own smoke. Insanity, being almost peculiar to nations highly advanced in civilization, and to individuals endowed with strong passions, keen sensibility, great energy, and high intellectual talent, seems to have been designed not only as a temporary respite from suffering, but also as a mortifying beacon to the wise, lest they should glory in their wisdom. There is surely, therefore, no apology necessary for introducing into lectures that are not professedly medical, a plan for preserving the best and most stately of our race and of our countrymen from becoming martyrs in the cause of human aggrandizement, and from becoming ruinous monuments of human ambition.

THE NECK.

On tracing the two grand vital organs, alimentary and respiratory, up to their commencement, we land in the mouth and the nose. By stretching to such a height, these great vital organs possess a central situation most convenient for the performance of their functions; while the two porches, by which all the materials necessary to life have their entrance into the body, are stationed in the vicinity of the brain, and watched over by the whole council of the senses, which require for the performance of their duties a commanding elevation.

As situation and motion are quite immaterial to the brain itself, so the neck must be devoted to the elevation and motion of the face. As the face contains not merely an assemblage of senses, but also the primary organ of grasping, so strength is a quality as requisite as length to the neck. But strength and length stand opposed to each other, and render a compromise necessary, in virtue of which we meet with no neck so short as to be incompatible with free

motion of the senses, or so long as to render the powers of grasping inadequate to the requisitions of the animal. The length of the neck is principally subservient to the ears, the sentinels appointed to watch over personal safety. Accordingly those animals which are exposed to danger from their stronger neighbours have elevated ears and long necks; and all animals, when under apprehension of danger, stretch the neck for the purpose of elevating the ears. The strength of the neck, on the other hand, is devoted to the service of the mouth as a grasper. The prompt predaceous eye can dispense with elevation for the sake of strength. Accordingly, strong courageous animals are endowed with short thick necks, and in making an onset actually contract the neck, so that they may be able to impel their teeth against the prey. In the endowment of weak timid animals with long mobile necks, and of strong courageous animals with short thick necks, may be seen a slight specimen of divine wisdom and benevolence. Where strength is largely bestowed, rapidity of movement and of discernment is withheld; and where strength is withheld, compensation is al-

most made by rapidity of movement and of discernment, whereby that danger which cannot be withstood may be for a time eluded. Accordingly, the short neck is generally the muscular neck, as the rough and well marked processes and ridges in the base of the skull testify, and is also generally accompanied by the large head, and the energetic intellect. Thus we see that whatever slight advantages nature may bestow in pity upon the weak and timid, yet the courageous and the strong are the favourites to whom she has intrusted the intellectual concerns of the world. Courage is as necessary to the direct promotion of science as to its indirect promotion by the acquirement of plentiful supplies of food, and the maintenance of personal safety; for a timid philosopher is as unfit for the pen, as is a timid soldier for the sword. The slender neck bespeaks not only weakness and timidity, but also all the other qualities which follow in their train. The thick neck on the contrary, bespeaks not only strength and courage, but also all the other qualities which flow from them. The former is pliable, alert, and calculated for obedience.

The latter is stiff to a proverb, imperious, and destined to command. Although the neck is not subservient to the brain, yet the distance at which the neck holds the brain from the vital organs, best accounts for the correspondence between the shortness of neck and the fire of the animal character. As the neck is the stalk upon which the senses are held up to take their survey of the necessaries and comforts of life amidst which they are placed, so the posture or attitude of the neck must mark the earnestness of the character in the pursuit after these necessaries and comforts. In physiognomical signification the neck participates with all the organs to whose service it is devoted; but in that low degree only which its mechanical office merits. The earnestness of the animal is indicated by the direction of the neck. The more the neck is bent forward, the more are the senses bent upon their objects. Bending forward of the neck indicates earnestness or keenness in whatever pursuit. Accordingly, in all those emotions and affections, of which attention or concern forms an ingredient, the neck is bent forward;

whereas, pride, confidence, indifference, are all characterized by a neck bent backward. The intermediate erect attitude bespeaks a character between the earnest and the haughty —bespeaks dignity and firmness, and gives an etymology to the words rectitude and right. The earnestness represented by the neck bent forward, is liable to degenerate into cunning and meanness; whereas, the pride represented by the neck bent backward is apt to degenerate into supineness and apathy. The heads of proud maniacs are bent backwards; whereas the heads of melancholics are bent forwards. In all strutting and vapouring, the head is carried back; whereas, in humility and respectful homage of all kinds, and in all places, and by all people, the face falls forwards. All the truly great men who have acted distinguished parts, whether glorious or infamous, or who are at present acting in the great drama of human life, have the neck, with all the senses at its extremity, stretched forward, in all the eagerness of a hound in pursuit of its prey. Without attention, without concern, without earnestness, without eagerness, the human mind can

arrive at nothing that is great. Nay, such is the nature of the human mind that, without activity, and persevering activity, the highest natural talents are capable of little that is really valuable. While such is the nature of the human mind, that faculties of the most slender stamp may, by dint of exertion and perseverance, like the snail in the race with the hare according to the fable, in the end get soonest to the goal. But it does not follow that every person with this characteristic of attention and eagerness in his pursuit, shall always succeed. The devising of plans is not accomplished by the neck nor consummated by mere attention; nay, let the plans be laid in all the wisdom of foresight, and put into execution with all the resolution and perseverance of enthusiasm, still the most calculating man is so much the thing of circumstances, and the competitors for the same prize are so numerous, that failure is always much more frequent than success—that indeed to succeed is little else than to supplant.

Underneath the epiglottis, as the name implies, lies the glottis or chink of the larynx,

whose primary office is to guard the lungs against the intrusion of any thing hurtful; and whose secondary office is to form the voice. The larynx is not the organ of speech, but of voice, and being situated in the passage to the lungs, bespeaks something relating to energy. We will afterwards find that articulation is performed by the mouth, and, from thus being situated in the passage to the alimentary tube, bespeaks something relating to appetites and passions. The larynx, in a physical view, guards principally against any intrusion of the alimentary materials passing down the pharynx, and, in a moral view, guards principally against the effects of those appetites and passions which reside in the alimentary organ, whether by soothing them, or by giving warning of the danger. But the larynx not only guards against the entrance into the trachea of meat and drink, but also guards against the inhalation of deleterious airs, which the sense of smell might be incapable or too late of detecting. The sense of smell is chiefly percipient of what may be floating in the common atmospheric air, and of the food and drink, which are all whole-

some or unwholesome in proportion as their smell is agreeable or disagreeable. But the glottis, by the chemical stimulus of the deleterious gas, is immediately shut by spasmodic contraction of the laryngeal muscles. Although this contraction of the glottis does not always save life, yet the effort to save the life is not the less manifest. Those gases which are not directly deleterious, but which kill from not possessing the properties of atmospheric air, are allowed to pass into the lungs; for the exclusion of such gases could have served no useful purpose. This little apparatus, therefore, is the great safeguard to the lungs, and is indeed the only door which opens and shuts in the whole passage of the breath. The larynx, as an organ of voice, ought perhaps to lead us a little into the science of music, but as the ear has been ever held to be the seat of the musical faculty—to be the regulator of the musical performance of the larynx, as well as of all instrumental music, so we must, in the mean time, defer the melodies, and advert to the different monotonies of the human voice.

The size and laxity of the larynx determine the extent of the vibration, and of course the depth of the note in the gamut; the force of the breath determines the loudness; while the extent of the facial sinuses, which, by reverberation, prolong the sound, gives the sonorousness. Every human larynx, small and large, is able to form all the notes of the gamut, from the lowest base to the highest treble. A small larynx, however, cannot dwell with facility on the base key, and, for forming base notes, must be so relaxed as to be incapable of extending the voice to great loudness;—whereas, a large larynx cannot, with facility, dwell on the treble key; but can easily extend the base to a high pitch. The larynx of the male is larger than of the female, and his voice is the graver of the two;—he is also the stronger and the more courageous. The larynx is larger, and the voice graver, in predaceous animals than in timid. Commands, threatenings, and exclamations of rage, strike at the bottom of the gamut; while the screams of fear strike at the very top. These facts, taken in conjunction with the larynx entering into the composition of the respiratory passage, and with

the share which the breath itself takes in the formation of voice, point out the large larynx, and the grave voice, to be marks of strength and courage.—Here, it may be proper again to remark, that all the dangerous passions produce, and are expressed by, violent expirations,—while the emotions of fear produce, and are expressed by, long inspirations. In preparation for the immediate performance of any mighty enterprise, we draw in a full breath, and by shutting the glottis hold it in. The glottis then serves a most important part in the performance of any mighty enterprise, by enabling us for a time to dispense with the motion of respiration—by converting the whole chest from a hollow to a solid structure—by giving a mechanical advantage to some of the principal muscles of the arm—and by directly increasing the vitality. All this assistance the larynx affords towards any fair and noble undertaking. But where the angry and offensive passions have a place in the undertaking, there the delicate musical larynx, being unable to sympathize, throws wide the glottis and allows the ebullition of passion to get vent,

and the energy dangerous from such a prompter to get exhaustion in violent expirations. It is not because the angry man is too rapid and violent in his exertions that he is so frequently overcome by his cooler antagonist, but because the energy is soon exhausted by the violent expirations of rage. The larynx may be looked upon as the mouth of the pulmonary apparatus. Closure of the glottis indicates a command over the energy. The more the breath can be detained by the glottis, whether in the gentle expiration, or in the mild persuasive eloquence, or in the sweet strains of music, the more is the energy placed under prudential control; whereas the more the expiration is violent, and the less it can be held under laryngeal restraint, the more ungovernable is the energy, and the more readily is it driven before the gust of passion.

It is by the larynx that the more ostensible part of weeping and of laughing is performed. Nature declares her preference of weeping to laughing, by intrusting weeping to inspiration, and laughter to expiration; and thus seems, in

natural language, to corroborate the scriptural and experimental doctrine, that it is better to go to the house of mourning, than to the house of mirth. Weeping sooths, refreshes, and exhilarates the mind, and at the same time cherishes those sympathies and sensibilities by which mankind are knit together; whereas laughter exhausts individual strength, and at the same time repels all sympathies, and raises enmity in every quarter. Weeping is relieved by several sympathetic discharges, and especially by the lachrymal—indeed belongs more properly to the eye, but seems to have a place in the vital organs, for the sake of having a more radical fixture in the constitution, and to have a place in the larynx for the sake of announcing the distress, and of calling forth sympathy and aid; whereas laughter stirs up no sympathetic discharges, but is allowed to exhaust itself in the region where it commenced.

Against every moral as well as physical defect, Nature has provided a remedy. She has provided revenge against injustice; hatred a-

gainst malice; contempt against meanness; and laughter against folly—a thing so obstinate as to require more than a silent reprimand. Injustice, malice, meanness, and all the other moral depravities that can be engendered in a human breast, have, besides external remedies, checks and punishments within. But folly, from the very nature of its proprietor, has no such check within: that without therefore requires to be the more severe. Laughter is designed to be at once the punishment and the cure of folly. It enters so much into all our social frolics, that we have almost come to synonomise it with mirth. Laughter indeed is a merry thing; but it is a merry satire. The wit that excites laughter is either artificial folly, or an exposure of real, and extends from the mimickry of the lowest piece of aukwardness, up to the most pointed of all Euclid's *reductiones ad absurdum.* Mankind in the main, are wags, and wits, and satirists, and critics, almost all laughing, or smothering the laugh, at one another. Laughter is peculiar to man, requiring a degree of intelligence no less than human; but all animals which act from design may be objects of

laughter; nay, some of the more intelligent of the inferior animals seem somewhat susceptible of its salutary influence. Folly, in order to produce free convulsive giggling, must be innocent. Where there is any mixture of wickedness in the folly, there the larynx refuses to share in the sport, but throws wide the glottis to give vent to the hollow expirations of rage: or where the angry passions predominate over him who discerns the folly, however innocent and sportive it may be, there we have a grin instead of a laugh. Laughter, being peculiar to rational animals, and implying the discernment of folly, is to a certain amount a mark of wisdom; but indicates merely that degree of wisdom which is ever casting up the difference between itself and the wisdom of the object of ridicule. The laugher does strike a balance of wisdom in his own favour; but, by the very act of laughing, inadvertently confesses that the inferiority of the fool is not such as to forbid the comparison.

The excavations or sinuses, in the osseous

structure of the face, assist the larynx by giving reverberation to the voice. The more compact the osseous fabric of the face, the more violent and cunning is the animal—of this the tiger is an example;—whereas the more the osseous structure of the face is expanded into sinuses, as in the lion, giving sonorousness to the voice, and as it were an honourable warning to the prey, the more noble and generous is the character.

MOUTH AND NOSE.

In front, and in termination of the pharynx, and of the larynx, are situated the mouth and the nose, the porches of the alimentary and respiratory organs. As the thorax is situated above the abdomen, in order to give a ready passage to the breath, so the nose is situated above the mouth for the purpose of receiving odorous effluvia from the food and drink. To admit of this relative position, and at the same time to allow the œsophagus to lie behind, under the protection of the strong elastic wind-pipe, the

two tubes require to cross each other, and that the voice may be driven through the mouth for articulation, require to open into each other. That the wind-pipe is thus more exposed than the œsophagus, by no means bespeaks food to be more essential than breath to the animal economy, but arises from the wind-pipe being an inert tube, allowing, not performing, transmission of air; while the œsophagus itself performs deglutition. In this crossing of the two tubes, the air of respiration is not liable to pass down the œsophagus, for it is not an open tube, nor has the stomach a self-expansive power, like the chest. Food and drink, however, would have been apt to pass along the wind-pipe, or at least to offend the glottis, and disturb respiration, but for that most simple and elegant contrivance, the epiglottis.

As we were formerly obliged to consider the respiratory organ in conjunction with the alimentary, so we are now equally obliged to consider the respiratory orifice—the nose, in conjunction with the alimentary orifice—the mouth; not only in virtue of the close mutual

dependance between the two great vital organs, but also in consequence of the intimate connexion, both in structure and function, between the mouth and the nose themselves. The upper jaw-bone enters into the composition of both the mouth and the nose. Here is a connexion which cannot be wrenched asunder, without violating both organs. It has not been without a reason, that the solid basis of the mouth and nose should consist of almost one continuous bone, in the midst of so many sutures;—of a bone virtually continuous in so far as the junction of mouth and nose is concerned. The nasal organ is not only connected with the mouth in osseous, and as we will afterwards see in musculous, structure, but is also so situated as to receive odorous effluvia from the food, which is, especially in its natural form, salubrious, in proportion to the gratefulness of the odour. The mouth, in requital, assists the nose in emergencies to transmit air and expectoration. Whatever subordinate distinctions, therefore, may subsist between the mouth and nose, or between the different parts of either, still this close connexion, in structure and function,

must be viewed as circumscribing the mouth and nose within one range of physiognomical signification, common and peculiar to both. Although the mouth and nose are thus firmly connected together, yet they hold relations with the rest of the face. The upper jaw stretches upwards to the orbit, and to the frontal bone, and thus seems to claim kindred with the eye, and to hold a direct commission from the imperial brain. Thus the mouth, the nose, and the eyes, seem to claim mutual kindred with each other, as if they were all interested in one common cause, and intrusted with one common duty; but, as if with one accord, disclaim any direct connexion with the timorous ear. But although a consent of function is declared, not only by the upper jaw entering largely into the formation of the orbit, but also by the same fluid which moistened the eyeball, being transmitted along the nasal duct to moisten the nose; yet a complete distinction in rank between the mouth and nose, and the eye, is equally declared, by the upper jaw-bone forming the very base of the sockets, by the lachrymal fluid first serving the purposes of the

eye, before passing down to the nose, and by the mouth and nose looking downwards to the vital organs; while the eye, as also the ear, look upwards to the great intellectual organ, the brain. The mouth and nose then indicate animal qualities as distinguished from moral and intellectual—animal appetites and passions in virtue of connexion with the alimentary organ, and animal energy in virtue of connexion with the respiratory organ. As our present objects of contemplation are the mouth and nose, leading to their respective organs, let us, for the sake of distinctness, suppose that the mouth and nose alone, terminate the human neck. Here we have a picture—a monstrous picture indeed, of animal appetites and energy, poking, and gaping, and smelling after food, under the guidance of deaf and blind instinct. As in the course of animality, brain, and ears, and eyes spring up and improve, instinct gradually gives up her charge to intellect; and organs of grasping spring forth sufficient to allow the mouth and nose to be drawn in to the vicinity of the eyes and the brain, until at length Nature manages to

gather all the senses into a group, and thus to concentrate the perceptive faculties. In this solicitous gathering together of the senses, there has turned out the round compact face of the tiger; but when the difficulties and gormandizings of a ravenous life have increased the intellectual faculties—when strength has been refined into wisdom—then the features are again let down, better organized and arranged, into a vertical plane, whence the senses can enjoy a more deliberate, and yet a concentrated, perception. The features of the human face run so imperceptibly into one another, and yet stand at so equal and respectable distances from each other, that the physiognomist is at a loss, from a mere outward inspection, how to arrange them, and what mental quality to apportion to each. But when he turns his eyes upon the lower tribes, and finds the mouth and nose so faithfully accompanying each other, while they stretch from the eyes and ears, to the very extremity of a long bestial snout, he can be in no hesitation, even from an outward inspection, to class the mouth and the nose together. But

although from this accompaniment, and from the connexion in structure and function, he is warranted in classing the mouth and nose together as radically distinct from the other facial features, yet he must bear in mind, that in as far as Nature gives up her arrangement of the features into distinct groups, by bringing them all into one company, and into one plane, in so far does she allow them to participate with each other in function, and in physiognomical expression. The mouth and nose, therefore, although at bottom they have the nature of the beast, yet when drawn in to the same vertical plane or floor with the eyes and the brow, become humanized, and assume moral and intellectual airs.

MOUTH.

All living beings require food for purposes already taken into consideration, and this food is received into the circulating system by absorption. Those beings that are stationary, called vegetables, send down absorbent roots

in all directions through the earth, in search of food. From these comparatively inert roots we find a gradation up to the tubular tentacula, possessed by a set of beings which occupy the line of distinction between vegetables and animals. Locomotive beings called animals, instead of sending out absorbents for food, are provided with organs for bringing the food to the absorbents, and with a reservoir for containing and preparing it. At the bottom of the animal kingdom, the body is little more than a bag into which there is a single and a simple opening. From this simple opening into the polypous bag we have, in the progress of animality, a beautiful gradation up to the complicated and highly organized human mouth. Through all the stages of animality, the mouth is by far the most expressive part of the body; even the human mouth, although the lowest, both in situation, and in the rate of the senses, of all the facial features, is the most significant feature in the face, and makes up by quantity of expression for all deficiency in quality.

It is worthy of remark, that in ascending the scale of animals, we meet with teeth and jaw bones of no mean description, where nothing like an osseous structure can be perceived in all the rest of the body. Nature seems to set a very high value upon the mouth, not only in giving it an effective structure, and in endowing it with a high relish, but also in placing it right before the impelling force of all the animal appetites and passions, and immediately under the direction of all the faculties, moral and intellectual. But this favourite of Nature has not been saved from pains and toil, in acquiring this improvement of structure, and of function, and of privilege. As in a rude state of society every individual must provide every necessary article for himself, so in a rude state of animality the mouth is its own principal provider; but in the progress of animality, as of society, division of labour arises, and the toil of procuring food devolves upon other organs. From the opening into the polypous bag up to the human mouth, this organ has witnessed many scenes, has partaken of many kinds of feasts, and has served a long and arduous ap-

prenticeship to the foraging trade. Even before arriving at humanity, the mouth is beginning to be saved from the mechanical drudgery of procuring food, and is advancing to the service of intellect,—to the important duty of articulation,—a most happy *succedaneum* to the gross occupation of biting, and tearing, and devouring.

In tracing the history of the mouth up from its rudest commencement, we find that it has gradually become better and better adapted for eating. In this gradual improvement of the mouth, there has not been made the smallest sacrifice to speech, or to any other secondary function. The human jaws are the best grinders; the human salivary glands furnish the best and the most copious saliva; the human lips and tongue are the best adapted for keeping the morsel, though broken into a thousand fragments, between the teeth; and the human is the best tongue for transmitting the morsel back to the pharynx. It happens, however, that the mouth, in proportion as it has become better and better adapted for eat-

ing, has, at the same time, become better and better adapted for speaking, but has proportionally lost the power of grasping, not however, until other organs of grasping had sprung forth. The two offices of seizing and masticating, although they conduce to one purpose in the animal economy, antagonize each other; for the jaws that are most adapted for seizing, are the least adapted for masticating, and in proportion as they improve in mastication, do they forfeit the power of seizing. But although the duty of grasping has been, on the principle of division of labour, almost wholly transferred from the mouth to other organs, yet even the human mouth is not altogether saved from the trouble of helping itself. The food, indeed, is held to the mouth more dexterously, and more politely, by the human hands, than by the feline paws; but the human mouth, as well as the feline, requires to seize the morsel, howsoever handsomely presented. That the duty of seizing, as well as of masticating, is still incumbent on the human jaws, the very structure of the teeth demonstrates; for the fore

teeth are calculated mainly for seizing; the hind teeth mainly for masticating. The front teeth, as they are the cutting part of the weapon, as they are the blade, while the jaw bones are merely the handle, must point directly to the animal rapacity. The farther the teeth project before the great temporal and masseter muscles, the greater is the range of attainment, but the smaller is the power of biting. Thus oral projection and recession are placed under mutual limitation. Upon this very principle of mechanics, the grasping teeth have been placed in front, and the grinding in the rear. While the back teeth present pictures of cattle lying at their ease chewing their cuds, and of men sitting at table and rolling the delicious morsels in their mouths, the front teeth represent an animal ranging about in search of the necessaries and comforts of life. Thus the animal character of man is a combination of tiger and lamb. He is the tiger until he catches the prey; and then he masticates with all the innocence and mildness of the lamb.

On holding the head of a skeleton at a little

distance from the eye, the two jaw bones seem to constitute the general fabric of the face, while the little nasal bones, malar bones, vomer, ungues, &c. resemble the chips of stones with which masons fill up the little interstices in the building. The jaws actually extend from the frontal bone to the extremity of the bestial snout, and to the tip of the human chin. The human brain has arrived at such a magnitude, and has thrown the face so much into the shade, that the human neck appears to be little more than a pillar of support to the ponderous brain. But on stepping down among the quadrupedal tribes we find the jaws to be the proper termination of the neck; we find the whole face and head to be just a mouth furnished with a few convenient appendages, and that this well organized mouth is just the grasping extremity of the neck, as the hand is the grasping extremity of the arm; grasping therefore is the primary duty of the jaws, and serves to the animal, what the indefinite sub-division and spreading about of the roots serve to the vegetable. As the mouth is the termination of the alimentary tube, so the grasping powers of

the jaws bespeak gross animal rapacity. Here there is no indirect moral or intellectual manœuvring in the acquisition of food; but a prompt seizure, and a direct conveyance of the prey into the stomach. In all animals the rapacity is proportional to the powers of grasping, not necessarily however to the grasping powers of the jaws. Nature adapts the rapacity to the powers of satisfying it; but in the progress of animality she gradually transfers these powers from the jaws to the claws, and to the fingers. The jaws merely indicate what of the rapacity is grossly animal. In that stage of animality, where grasping is limited to the mouth—where the whole structure of the jaws is so devoted to grasping, that they actually seem to stretch forward toward their object, there animal rapacity is at the grossest pitch. As we ascend higher in the scale of animality, we find that the fore-feet take a share in the grasping, and allow the jaws to recede. By this change, locomotion has lost nothing, for the feet do not begin to seize until they have done their part in the chase; but the faculty of grasping has gained much, for the range of attainment is

not diminished, while the power of eating is greatly increased. On ascending to the very top of the animal scale, we find that the powers of grasping are greatest, and that the projection of the jaws is least. But the grasping, in changing its place, has also changed its fealty, and has become a subject of the moral and intellectual dynasty. Although the human jaws are, in a great measure, saved from the gross employment of seizing, and tearing, and devouring, yet the same law regulates the projection of the human, and of the bestial jaw. Projecting jaws, as they are generally accompanied by a proportionally receding scull, imply also stupidity. But although an animal is stupid in proportion to the projection of the jaws, not because the jaws project, but because the brow recedes; and although, in a general view, the converse follows—that an animal is more intelligent in proportion to the recession of the jaws; yet when the recession falls within the perpendicular, then we find the abilities begin again to diminish. The natural mental ability is denoted by the brain, but the natural ability, however great, is of no avail without

exertion; there is not such a thing as natural learning or acquirement. Activity therefore becomes necessary, and its degree is denoted by facial projection. By combining a small brain with projecting jaws—in other words, by combining stupidity with rapacity, a double purpose is served; for deficiency of intellect is in the mean time made up to the animal by exuberance of activity, while this very rapacious activity is, both in a moral and physical point of view, the means appointed by Nature for ultimately increasing the intelligence. As mental acquirement is not transmitted as a native inheritance from parents to children, so every individual in succession, must exert himself in order to turn his natural ability to account. The human mind during inactivity does not remain stationary, but takes a retrogade movement towards those stationary tribes which enjoy complete inactivity. Hence activity is as indispensable as ability, and the best relative proportion of the two, is that which is indicated by the perpendicular brow, and the perpendicular face. Where the brow recedes, there is a want of mental ability. Where the

jaws recede from the perpendicular, there is a want of activity. In both cases great intellectual acquirement is precluded. But where you find a perpendicular face attached to a perpendicular fore-head, there you have the ability and the activity in the most balancing proportions. It is not necessary that the plane of the face should be continuous with the plane of the fore-head, but merely that both planes be perpendicular. Nature seems to aim at bringing all the perceptive organs into a perpendicular plane; so that having our mark before us, we may push forward without turning either to the right hand or to the left. But it is not necessary that the plane of the brow be continuous with the plane of the face; on the contrary, the more the plane of the brow stands before the plane of the face, the more does pure intellect predominate over activity, as we will see when we come to speak of the brain.

In no part of the human body except the mouth do we find naked bone. For the purpose of having a complete cutting and grinding

instrument, Nature has not only dispensed with any covering, even with periosteum, upon the exposed part of the teeth, but has also tipped them with stone, that they might be qualified to break down all kinds of food however hard, even bone itself. As the teeth not only constitute the cutting edges of the instrument, but also are most open to observation, especially where and when physiognomical observation is most necessary, and as they do not always follow the direction of the jaws from which they grow, so these two semicircular rows of hard spikes and knobs of bone are the most expressive part of the mouth, and deserve a more ample discussion than the multiplicity of our subjects will presently allow. In comformity with a general law, that the longer time an animal takes in arriving at maturity, the higher towards perfection shall he reach, man has to pass through a tedious gradation of bodily growth, and a long severe ordeal of mental education. As all our moulds and models require to be at first soft for taking on the desired shape, so the whole animated world, in the progress of animality, passes more and more from

succulency to firmness. Thus the structure of most of the lowest animals is so tender, that Nature has been under the necessity of incasing those most exposed to injury, within shells, or crusts, or scales; but as we ascend among the higher classes, we find the animal texture gradually to gain greater and greater consistence, until we come to beings that no ordinary force can disorganize. In this computation of resistibility, however, we must suppose the animal exposed to strokes from objects in their natural state. If a sword or other sharp instrument be taken into the account on the one hand, helmets and bucklers must also be taken into account on the other. This gradation in texture extends not only from the bottom of the animal kingdom to the top, but also from the commencement of every animal to its termination. In the gradual transition of every animal, from the fœtal to the adult state, we see in miniature the great transition of the animated world. The fœtus, the infant, the boy, nay, even the young man, continue more or less soft to admit of more thorough evolution, and of more complete formation. But the teeth

from the first require to be hard, and yet they, in preference to all the rest of the body, require enlargement in the progress of stature, and in the rise of exertion. So soon as the child is born, there is in readiness a food most suitable for the succulent bodies of infants. Here teeth, so far from being requisite, would have been detrimental. But by and by the helpless phlegmatic infant becomes the stirring child requiring a more substantial food; biting and mastication now become necessary, and for this purpose, one tooth sprouts out after another, until at length both jaws are filled with teeth, and the child has grown into the playful hungerly boy. About this time the growth of the body goes on rapidly, the sphere of action is gradually expanding, and the mind is hastening to that period, when play-things are to be thrown aside, and when all the appetites, and energies, and faculties, must open upon the world. To qualify him for acting on this enlarged field, a more copious supply of more substantial food becomes necessary; for which purpose the jaws extend, new teeth evolve and displace the former, until at length

the boy has become enlarged into the man, and the son has become transformed into the father. How fraught with benevolence is that law, which ordains that, for the most exalted end, those young shall continue the longest unable to provide for themselves, whose parents are the best calculated for the delicate and difficult charge. As the teeth are a continuation of the alveolary processes, so projection and recession of teeth have the same physiognomical signification as projection and recession of these processes; but in a degree as much stronger, as teeth are more efficient than gums. The more the human teeth, in point of size, of shape, and of arrangement, approach to those of carnivorous animals, the more violent and rapacious is the animal character. On the contrary, the more the human teeth, in size, shape, and regularity, approach to those of granivorous animals, the more placid is the animal character. Here it may be proper to remark, that the acmé of facial projection is generally situated either in the nasal, or in the oral region. Where it is situated in the nasal region, there predaceous energy is the promi-

nent part of the animal character; where it is situated in the oral region, there appetites and passions stand in the fore-ground of the animal character.

As food is not only subservient, in the great plan of creation, to intellectual functions, and necessary to their very existence, but is also the main mark towards the attainment of which all our faculties directly or indirectly drive; as the jaws are the primary grasper of food; as the breadth of the jaws, from the opening into them being horizontal, determines the size of the current of food into the stomach; and as the current of food is proportional to the current of faculties which issued forth for its acquirement;—so, by a kind of transposition, admissible and indeed necessary in the application of physiology to physiognomy, we have the breadth of the jaws indirectly representing the amount of all the faculties corporeal and intellectual. How far the lips modify the breadth of the channel, and the size of the current, shall be afterwards considered. We have already found that projection of mouth is

devoted to the attainment of food; we now find that breadth of jaws is subservient to the devouring of food after it has been attained. Nature, in her solicitude to have her creatures well fed, may give a superfluity of attaining powers; but the meal devoured, and of course the aptitude of the mouth for devouring, must bear a kind of mathematical ratio to the whole functions, since the food is mainly devoted to functions. Broad jaws, therefore, receptive of much food, argue powerful functions. But as functions are not necessarily intellectual, and as the intellectual faculties are indicated by the brain, and the strength of intellectual faculties by the breadth of the brain, so the relative breadth of head and of jaws shall mark the natural channel for the flow of intellect. Accordingly, where the jaws are broader than the head, there the channel for the flow of intellect is wide; but the fountain is scanty. This relative conformation of head and jaws, is the characteristic of strong passions, and weak intellect. Accordingly also, where the jaws maintain nearly the same breadth as the brain, there the fountain just keeps the channel full. This

relative conformation of head and jaws bespeaks a character who can exert all his intellectual powers on a subject—who is calculated for scientific pursuits. Accordingly also, where the jaws are much narrower then the head, there the channel is too narrow for carrying off the profuse supply of the fountain, so that the intellectual current passes down in an impetuous jet. Here the mind acts most forcibly and most keenly upon a small spot at a time. While the narrow head with broad jaws, represents a large smoking fire; while the broad head with broad jaws represents a hot smelting furnace; the broad head with narrow jaws, represents the keen sharp flame from a blow-pipe. This tapering of the head and face from above to below, indicates natural cunning—natural only, for the broad face may be trained into artificial cunning, and the sharp tapering face may be restrained into artificial sincerity; not however without leaving correspondent impressions on the soft parts. In examining the anterior plane of the face, we found that recession from the perpendicular indicated deficiency of animal character. On now examining the

lateral plane of the face, we find that recession from the perpendicular also indicates deficiency of animal character. Cunning is at once an indication, a consequence, and a partial cure, of some primary deficiency. If an animal were sufficiently wise to keep clear of all difficulties, and courageous enough and strong enough to stand his own ground, he would not have stood in need of cunning. A face, therefore, tapering into narrow jaws, denotes a character whose basis of animal appetites and passions is feeble; but this tapering face, while indicating such radical deficiency, also indicates how it is supplied by stratagem, which is more conducive than open dealing to general improvement. A bestial face tapering from above downwards, indicates sheer cunning, whose object is self-preservation, whether in acquisition of prey, or in elusion of danger. Human cunning may be said to run ultimately into the channel of self-preservation, but has so many meanderings through all the windings and turnings of social life, and through the extensive and complicated field of human intellect, as scarcely to join the great animal stream

before it disembogues itself. The cunning of the fox is directly and exclusively devoted to stealing prey, and eluding detection. But human society is so organized, that the Sternes and the Voltaires are necessitated to discharge their cunning in wit. A human head and face tapering from above downwards bespeaks wit—strong in proportion to the breadth of the head—keen in proportion to the sharpness of the jaws.

We have been hitherto considering the two jaws conjointly as they meet each other, teeth to teeth, and form one instrument of grasping and eating. Let us now view them separately. If we descend much below the class mammalia, the division into upper and lower jaw becomes inadmissible; for these lower regions, of the animal kingdom, contain all the first rough sketches, so to speak, of the mouth, such as moveable lateral jaws, moveable upper jaw, &c. as if Nature had been filling up all the space, from the most rude to the most finished mouth. All the mammalia, however, and it is needless to descend lower, have an upper fixed, and a lower

moveable jaw. In taking a contra-distinguishing view of the two jaw bones, we find that the lower jaw contains organs of digestion, organs of deglutition, and the organ of taste, the immediate superintendent of the food passing into the stomach, and is itself the active instrument of mastication; but does little more in the duty of grasping, than assist in keeping the hold—that, on the other hand, the upper jaw, in the duty of mastication, is little more than the anvil upon which the food is mashed, but, in the duty of foraging, is the principal weapon of attack, and contains the sense of smell—a sense devoted, as we will afterwards learn, to predaceous purposes, and gives support to the sense of vision—a sense more exalted in its nature, but yet devoted to predaceous purposes. Thus the upper jaw bone gives lodgement to one predaceous organ of sense, and assists the cranial bones to give lodgement to another; while the lower jaw gives lodgement to that sense which has merely to grapple at close quarters with prey, after it has been caught. Thus all of the upper jaw, lying above the roof of the mouth is a counterpart to all of the lower

jaw, lying below the floor of the mouth. The perpendicular depth of the alveolary processes and teeth, then, marks the perpendicular extent of the mouth; and the perpendicular extent of either alveolary process, reaching from the edges of the teeth to the attachment of the lips, all the way round, marks the oral extent of either jaw respectively. The intermaxillary bones, which are not only placed in the upper or predaceous jaw, but which promote its projection, are held to be the mark of the beast. Here it may be remarked, that the relative proportion of the lower jaw bone to the upper increases in the progress of animality. The lower jaw represents animal appetites, in so far as they refer to the immediate gratification of the stomach; whereas the upper jaw represents animal appetites, in so far as they refer to objects of prey. The lower jaw represents an animal in all its selfishness—the upper represents an animal in its relation to other animals amongst which it must play its part. The lower jaw looks inwards—the upper jaw looks outwards. The lower jaw represents the individual—while the upper represents the member of society. It is a common

remark in social life, that if a man does not put a proper value on himself, others will not do it for him. What our experience declares to be morally true, Nature seems to have established upon physical certainty; for throughout the whole animated world, the more the lower jaw maintains its ground with the upper, the more selfish is the animal, and the higher does he stand in the scale of animality. The chin, which is characteristic of humanity, may be viewed as the basis of the animal character. A large under jaw projecting at the mouth, denotes stern rapacity; a large perpendicular under jaw denotes strong animal selfishness; a large under jaw with projecting chin, denotes ambition—as if the huge rapacious under jaw of the tiger had receded at one place, but stretched out at another, into the insatiably ambitious chin of a Buonaparte.

The lower jaw is deepest at the chin, because this part is drawn downwards by the mylo-hyoid, genio-hyoid, and digastric muscles; while the lateral and posterior parts are drawn upwards by the temporal, masseter, and internal

pterygoid muscles. Thus the province of mastication is made to interfere as little as possible with the province of articulation. Those muscles which draw the lower jaw downwards, bear in themselves small proportion to the muscles which draw it upwards, and would have been quite inadequate to keep up alternate action, without great advantage in length of lever. As opening of the jaws is merely a negative action—a preparatory step to the closing of them, which is positive; so, with regard to the selfish character, in so far as appetites and passions are concerned, the opening muscles express negative qualities. Habitual openness of jaws, therefore, indicates some deficiency in the propelling force of the animal appetites. This is corroborated by the opening muscles not only pulling the chin downward, but also backward, and thus assisting so far to produce the retreating or pusillanimous chin. Openness of jaws, therefore, is allied to fear—forms, indeed, a principal part in the expression of that emotion. Where, however, the upper jaw, with all its predaceous apparatus, descends along with the lower jaw, so as to accomplish habitual closure of the

jaws, there we have a combination of fear and attention: in the descent of the lower jaw, we have fear; in the descent of the upper, we have attention; in the descent of both, we have earnestness of character. The closing muscles then must be considered positive, whether they bring the upper jaw down upon the lower, or draw the lower to the upper. Other things being equal, the courage of an animal is proportional to the size of the temporal and masseter muscles. The masseter and pterygoid muscles seem to be chiefly devoted to mastication, and perhaps the more the external pterygoid muscle enables the under jaw to perform lateral grinding motion, the more granivorous or mild is the character; while the temporal is the great predaceous muscle, and takes its origin from almost all the bones of the skull, giving it protection in its most vulnerable part, and claiming in turn, from the mental faculties, their participation in the important concerns of procuring food. In passing down from its cranial origin, this muscle separates the ear from the predaceous senses in front, pushes back the ear, and builds up the outer wall of

the orbit, and presses forward the lateral structure of the nasal organ, as if to prevent any direct communication with the ear, by keeping the nose and eye directed forward to their prey, and leaving the ear behind to watch over personal safety. But that the courage may be duly tempered with caution, an arm of bone is sent from the predaceous structure before, to meet with a similar branch from the cowardly organ behind; as if courage and cowardice were shaking hands over this potent muscle.

The upper jaw falls to be divided into what enters below into the composition of mouth, and what enters above into the composition of nose and of orbit. The extent of the alveolary process, or the distance from the nose to the edges of the upper teeth, marks out the oral portion of the upper jaw. The extent of jaw-bone above the roof of the mouth, or the floor of the nostrils, marks out the nasal and ocular portion. Now the greater the extent of the oral region, the farther must the predaceous senses above be held from the prime grasper below, and consequently the less fero-

cious must be the animal; for the more either an organ or an animal is eager, the more does it stretch towards its object. The upper jaw taken in its whole extent, may be styled the predaceous jaw; but the depth of the oral portion, by separating the predaceous senses from their object, acts as moderator of the predaceous tendency. Accordingly, we find that ravenous animals have a small distance between mouth and nose. The depth of the oral portion of the upper jaw, therefore, indicates how far the animal is disposed to disturb that rivetted devotion of the jaws to the stomach, by taking a more cool perception of surrounding objects in the engaging attitude of sociality. The deepening of this oral portion of the upper jaw seems, to the imagination, to have pushed the predaceous senses from the scenes of carnage up towards the brain, to a participation in more refined pursuits. But since the olfactory organ has been placed over the mouth as superintendent of the food, are we to conclude from this gradual separation of the nose from the mouth, that Nature is less solicitous for the safety of life, in the more advanced

stages of animality, than in the more rude? The idea is false, and utterly at variance with that exalted benevolence, which characterizes all the works of Nature; for the projection of the human nose makes up, and more than makes up, for the loss of propinquity to the mouth; while all the space gained by the deepening of the alveolary processes and teeth si devoted to speech. It is in virtue of this hollow in the roof of the mouth, that man can mould off his thoughts into words, and it is from want of a sufficient hollow in the roof of the mouth, that the ruder part of mankind, and many idiots, have deficient articulation. The inability of the ourang-outang to speak, does not arise from laryngeal defect, for he can drive the voice through the mouth; but from want of a sufficient concavity in the roof of the mouth, and from a want of sufficient brain. Thus Nature did not endow her creatures with speech, until they had acquired brains to think, and coolness to arrange their thoughts. The more deep, and ample, and regular this concavity, so that the tongue may have freedom to perform its innumerable and quick evolutions, the more distinct

must be the speech, and the more cool, steady and persevering must be the animal appetites.

The jaws, which are the main part of the mouth, indicate, by their size, the quantity, and by their shape, the quality, of animal appetites bestowed by the hand of Nature. The jaws, of themselves, are gross mechanical tearers, whose whole ability amounts to nothing more than biting and chewing, and whose continual occupation would be to devour, without limit and without discrimination, so that they would soon break themselves to pieces upon their indiscriminate prey. Accordingly, a face with the lips clipped off, presents to the imagination, the most hideous picture of insatiable rapacity, without government or constraint. The lips and tongue, however, lay claim to something more than mechanical; they hold the rank of sensitive, and have the charge of regulating the insatiable mandible. The lips, in virtue of the sense of touch, direct the jaws in foraging, and in virtue of that muscular apparatus which is independent of the jaws, modify their seizing tendency. The tongue judges and determines,

regarding the objects of mastication. The lips and tongue conjointly assist mastication, and perform the active part of articulation. But notwithstanding all these important duties, the lips and tongue are but appendages, whose primary office is to assist the jaws. Their attachment to the jaws gives them a physiognomical reference to animal appetites; while the influence exercised over the proper office of the jaws determines the kind and degree of reference. It is here worthy of remark, that the jaws have their nervous supply from the fifth pair of nerves, and the lips from the seventh—that nerve which issues from the brain in company with the nerve of music, and traverses the organ of music—as if the facial muscles were so many chords upon which this nerve was to play off the music of the soul.

Among the lower animals, the lips exercise very little independent action; but are moved along with the jaws to which they seem to serve the part of a mere covering. The bestial lips just cover the jaws to the extremity of the teeth, seldom or never over-lap them, but keep

always ready to retire in order to give scope to the teeth in seizing. But the human lips exercise a distinct independent office, and take the rule and management of the whole external duty of the mouth. The human lips are moderators and regulators of the rapacious tendency of the jaws. In proportion as the lips cover up and enclose the jaws, is the animal rapacity under prudential control. As bare jaws indicated rapacity without control, so a complete enclosure of the jaws, would be a picture of the devouring tendency completely subdued and covered up by the prudential system. Now, in so far as this enclosure gives way, so as to allow less or more scope to the devouring tendency, do you express animal passions, which are just so many partial and particular allowances or outlets of the great insatiable rapacious tendency within. As we formerly found that the jaws most adapted for eating, were also most adapted for speaking, so we now find that the lips that are most adapted for eating, are at the same time most adapted for speaking. The lips without, and the tongue within, in proportion as they are calculated for keeping the morsel be-

tween the two rows of teeth for mastication, are also calculated, from volubility and accuracy of motion, for articulation. The more the lips prevail over the jaws, so as to admit of eating and speaking without exposing the chamber of the mouth, the more are the animal passions under the prudential management; and the more this preponderance of lip over jaw, is equal at all points, so as to leave the smallest and the straightest horizontal chink, and the most opposite to the line of junction of the teeth, the more are all the animal passions in a state of equipoise. If the lips retire to give exposure to the jaws, animal passion is indicated; and according to the kind of teeth exposed, and according to the jaw in which they are situated, does the nature of the animal passion vary. We must now keep in view the arrangement of the teeth into the four incisors in front, and the two canine at either side, which may be styled the grasping teeth, and into those behind, which may be styled the grinding teeth. We must also keep in view, the distinction into the upper jaw, which regards

objects around, and into the lower, which regards self.

The lips are furnished with a muscular apparatus, which enables them to move in every possible direction. It is highly satisfactory for the physiognomist to know how motions are produced; and for this purpose, he ought to to make himself acquainted with the muscular machinery erected below the surface: but it would be vain for him to attempt an attribution of physiognomical qualities to muscles, just as it would be vain to attempt a description of walking, by enumerating the muscular contractions performed in the process. We have no consciousness of dealing with individual muscles; and the physiognomist, although he may laudably anatomize, has to do with external appearances only—with sizes, and shapes, and motions, howsoever produced. Indeed Nature herself in erecting her moving machinery looks to the motions, not to the muscles; for scarcely can two persons be found with the same number and arrangement of labial muscles. "On "trouve" says Winslow, "dans ces muscles tant

" de varieté dans les differens sujets qu'il n'est
" pas étonnant que les descriptions qu'en ont
" donné les anatomistes soient si differentes. Il
" y a des sujets où il manque des portions
" de muscles; d'autres où il est presque im-
" possible de les démêler assez distinctement, à
" cause d'une extrême paleur et attenuation des
" fibres. Il y en a où réellement on trouve des
" faisceaux particuliers qu'on ne trouve point
" du tout dans d'autres."

As the opening through the lips into the mouth is horizontal, so the orbicular muscle, notwithstanding its name, has merely the effect, when no other muscles interfere, in shortening this horizontal chink, and of course in opposing the buccinators, whose proper action, when no muscular interference is given, lengthens the chink. In a paroxysm of rage, the buccinators contract, and the labial chink is lengthened, as if in preparation to devour the object of rage. The same lengthening of the labial orifice, which, when temporary, announced a paroxysm of rage—when habitual, betokens habitual irascibility. On the other hand, the

more the orbicular muscle predominates over the buccinators, and the shorter the labial chink, the more benign is the animal temper. A temporary contraction of the labial opening is indeed a token of temporary pleasance. Let it be recollected, that the wide mouth refers merely to the animal temper, which may be superseded by moral discipline. The man who has managed to overcome his animal passions, by dint of intellect, is a more fully formed character, and is more generous, and capable of making allowances for the foibles of humanity, than the man of small mouth, whose whole placidity is constitutional. But let it be observed, that the animal character, however much it may be superseded by the moral or intellectual, is still in full force below—the spring may be bent down, but the elastic force is tending upwards. The most complete moral subjugation does not eradicate the animal temper, but merely suppresses. Whenever the prudential system is thrown off, then the animal below may burst forth from its confinement to the danger of all around. The superiority which the man, who has gained an ascendancy over

violent passions, enjoys over the naturally mild character, does not arise so much from the exertions to obtain the victory, as from the enterprizing tendency excited by this buoyant turbulency below. The world is not governed by meek mouthed people. The man, whose lips so shroud up the jaws, that they have no scope to gape and grasp at an object, is one from whom neither danger need be dreaded, nor enterprize expected. This lengthening of the labial orifice belongs to both jaws conjointly, and of course the rage expressed partakes of both the selfish and predaceous character.

Muscles originate from the upper jaw and from the cheek bone, and descend into the angles of the mouth, for the purpose of pulling them up, and of giving partial exposure to the back teeth of the upper jaw. This elevation of the angles of the mouth is smiling, whose object lies without. Muscles also arise from the lower jaw bone, and ascend into the angles of the mouth, for the purpose of pulling them down. This depression of the angles of the mouth gives the ex-

pression of seriousness and melancholy, whose object lies within.

From the angles of the mouth at either side there is a gradual increase in physiognomical importance, correspondent with the gradual increase in animal importance; for the middle of the lip not only covers the most important teeth, but has also the most active share in feeling, in eating, and in speaking. That part of the upper lip which covers the front teeth of the upper or predaceous jaw is furnished with muscular apparatus for elevation and depression. Elevation renders bare the predaceous seizing teeth; depression covers them up. The corresponding part of the under lip, covering the front teeth of the lower jaw, is also furnished with muscular apparatus for depression and elevation —for rendering these seizing teeth bare, and for covering them up. Depression of the middle part of the upper lip is a descent of the social part of the animal character over the rapacious, as if for the purpose of addressing instead of biting—indicates a sheathing of the sword, for the sake of a parley. The more the

upper lip descends over the upper fore teeth, the more condescending is the social part of the animal character. A peak descending from the middle of the upper lip bespeaks animal sympathy. On the contrary, elevation of that part of the upper lip which covers the front teeth is just a preparation to bite. When the dog uncovers his upper teeth, we at once say that he snarls. When man uncovers his upper fore teeth, he either snarls or sneers; for man has the advantage of the dog, in being a laughing as well as a biting animal. Thus we find that the upper lip, like the upper jaw, has respect to objects around. On stepping down to the lower lip, we find that it has, like the jaw to which it belongs, respect to self; for ascent of the middle part of the lower lip indicates animal pride, while descent indicates animal humility.

All the muscles of the lips may be divided into opening and closing—into negative and positive. The two depressors of the upper lip and of the wings of the nose, the two elevators of the lower lip, and the orbicular, are the clos-

ing or positive muscles. All the other retracting muscles, which appear like so many radii proceeding from the orbicular to the surrounding parts, are negative, in regard to the functions of the lips. A predominance of the positive over the negative muscles, distinguishes the man of education from the clown. Although the jaws and their functions are shut out of view, in the back ground, by the shrouding lips of polish and of education, yet the eating powers of the jaws remain unabated behind. In closure of the lips the animal sociality, and condescendency, and sympathy, of the depressors of the upper lip, is fairly met by the animal selfishness and pride of the elevators of the lower; while all the offensive passions of the retracting muscles find a general resistance in the complacency of a vigorous and active orbicular. The shutting muscles are few in comparison to the opening. This disproportion, and the human proneness to indulge in the angry and offensive passions, inform us how much of human happiness and improvement depends upon human exertion, and how far human passions, if left to themselves, would degenerate. The re-

tractions and distortions of which the human mouth is capable, show how far indulgence in passions is capable of sinking the human character; while the command which we can give the few closing muscles over the numerous opening, and the increase of power and size which muscles acquire by use, show to what indefinite pitch of restraint and refinement the human passions may, by persevering exertions, be brought.

For the purpose of shutting, we found only a couple of muscles in the upper lip; but for opening, we find the two nasal muscles, the two elevators of the upper lip, and the two elevators of the upper lip and wings of the nose. These are the muscular apparatus constructed in the upper lip for uncovering the predaceous teeth—for unsheathing the sword. In speaking of the osseous structure of the mouth and nose, we had occasion to remark their intimate connexion. We now find a similar connexion in their muscular structure—we find that the same muscles which shut the mouth also compress the nostrils; and that the same muscles which open the mouth, and al-

low scope to the predaceous teeth for devouring, also expand the nostrils for smelling, and give at once the stern expression of passion and of predaceous energy. Whereas those muscles which elevate the angles of the mouth give partial exposure to the back teeth, and express merely frivolous contemptuous smiles and laughter: for the carnivorous fierceness of front teeth is lost, and the granivorous mildness of hind assumed. Indeed the principal of these muscles, the greater zygomatic, takes its origin from that yoke of bone which stretches backwards to the ear. In going round the upper lip, for the purpose of getting at the lower, we pass the buccinators, whose office is to assist mastication, and to widen the entrance into the stomach—whose origin is chiefly from the lower or masticating jaw—and whose substance is traversed by the parotid ducts, the two principal conduits of saliva. Exclusive of the two cutaneous muscles, there are, for the express purpose of drawing downward the under lip, four muscles—the two triangular muscles, or depressors of the angle of the mouth, and the two quadrate muscles, or depressors of the under lip. The depressors of the angle of the mouth

are antagonists to the elevators, and of course indicate the very opposite of smiles and laughter —indicate, not contemptuous ridicule of others, but seriousness and melancholy regarding self. The depressors of the under lip are antagonists to its elevators, and of course indicate the opposite of pride. Thus we see that the expression of the middle of the under lip is more radical than of the angles, in as far as abject humility is more radical than mere animal seriousness, or even melancholy. Elevation of the middle of the under lip may give to its angles the appearance of drooping; but this apparent drooping may be easily distinguished from the genuine, by the integuments on the chin appearing to be drawn up, and by the line of junction of the two lips being situated higher than the line of junction of the teeth.

In the muscles and movements of the lips we have several antitheses. The muscles which raise the under lip are those of animal pride; whereas the muscles which lower the under lip are those of animal humility. Here is a direct antithesis in action, and a direct antithesis in sig-

nification. But again to these two sets of muscles we have a counterpart in the depressors and elevators of the upper lip. The depressors of the upper lip—the muscles of animal complacency and sympathy—not only antagonize the elevators of that lip, but also meet the muscles of pride—the elevators of the nether lip—and are willing to supply, with all condescension, as occasion may require, the place of the sinking lip of humility. How, again, to avoid incongruity of character, the elevators of the upper lip—the muscles of apathy—give way when the muscles of pride rise from below in all the irresistible stiffness of self-supremacy. The animal humility expressed by depression of the under lip places a kind of limitation upon the destructive tendency of the jaws when rendered bare for devouring—gives an animal a sense of all its weakness at the moment of embarking on the task of destruction. When from the middle we turn to the sides of the mouth, we find a contention between two negative sets of muscles: the one drawing down with all the indifference about others of deep-rooted concern and melancholy about self, the other pulling up in all the heed-

lessness about self, and all the point and poignancy at others, of smiling and laughing at their folly. When we turn round to the very extremity of the labial chink, we find a powerful contention between the buccinators, the muscles of rage, and the orbicular, the muscle of placidity —that muscle which forms the margin of the lips, which gives implantation and resistance to all the retracting muscles in their strenuous efforts to draw the lips from off the jaws, and may in short, be styled the labial muscle, for it is in virtue of this muscle that the lips maintain their existence—that they act the chief part of lips by shrouding up the jaws.

But the lips, although moderators, are by no means opponents of the jaws, but while checking and restraining in the mode assist in the thing. The lips, in virtue of their exquisite endowment with the sense of touch, and in virtue of their anterior situation, not only keep the jaws in check, but also lead them on to the attack, and direct them to their prey; while the tongue within doors, in virtue of its endowment with the senses of touch and taste, and in virtue of its

mechanical offices in mastication, and deglutition, keeps on the alert, and is ready to give assistance by reaching out of the mouth at the object, for the double purpose of ascertaining its salubrious and nutritive qualities, and of helping to get the morsel conducted into its own apartment. The lips, in their capacity of covering the jaws, indicated negative qualities, but in their capacity of foraging must point to positive qualities. To qualify them for this duty, feeling and motion are requisite. In the red of the lip is situated the sense of touch, in its most exquisite condition. Here the cuticle is thin, and is kept soft and moist with saliva; here the nervous papillæ are most abundant in number, and most delicate in structure; and here blood is distributed in profusion. This red edge is to the lips what the tips of the fingers are to the hands. For the purpose of bringing this sensitive part of the lips into contact with objects, the power of moving is requisite. The lips have the power of moving in every possible direction—indeed almost consist of muscular fibres. As projection of jaw indicated eagerness of the gross animal

appetites, so projection of lips indicates eagerness of the animal passions. Projection of lips is a step above projection of jaws, but yet from constituting part of the mouth denotes an animal quality. In the office of covering, the lips kept close to the jaws; but in the office of foraging stand forth as if for the purpose of forestalling the jaws. The more the lips are endowed with motion, and the more richly their edges are furnished with nerves, and the more abundantly supplied with blood, giving that fine vermilion colour to the edges which casts such a brightening gleam of animal pleasance over the whole face, so opposite to the white lips of fear, and rage, and disease, the finer and the more humanized are the animal passions. Where the muscular strength goes beyond the requisition of the sense of touch, the lips begin immediately to yield up that high superiority which this sense afforded them over the mere mechanical jaws, and to descend to a participation in the animal appetites of the jaws; but while the coarse passions of thick lips are apt to sink into the grossness of animal appetites, the fine passions of thin delicate lips are

liable to fly off into nicety and fastidiousness. That middle size of lip which combines promptitude with strength bespeaks sufficient force of character, without coarseness of animal passions. The tongue, for taking a part in this foraging duty, requires a wieldy structure, along with power and facility of motion; requires rounded cuticular papillæ on the upper surface; requires numerous small conical nervous papillæ on the tip and edges; and requires a regular supply of moisture for dissolving the sapid body.

Speech is not peculiar to man, for the chirpings and bellowings, and howlings resounding through the lower creation, are all so many degrees and kinds of speech. All the animated world below that stage of animality, in which alternate inspiration and expiration are performed, is dumb. All above can speak, for every one has lungs, and a larynx, and a mouth; and man can speak best, because he has the best lungs, the best larynx, and the best mouth; and can speak to the greatest purpose, because he has the best brain. To the superior organization of the human mouth, is man indebted for

being able to articulate so well; but to the intellect, and to the lesson given it from parent to child, and from generation to generation, is he indebted for a language in which to speak. Take language from him, imperfect as it is, and you throw him back into rudeness; take from him the faculty of speech, and you almost hold him there, for the hands, and indeed the whole body, would make but a dull substitute. Grant him the faculty of speech, and he will speedily emerge with a new language into civilization and science. We formerly found that the more the predaceous organ of smell was removed from the meeting of the teeth, the more cool was the animal character; that therefore by the deepening of the oral part of the upper jaw, and the cooling down of the animal character, there was at once going on a moral and a physical preparation for speech. It is not till we come to the human race, that the upper alveolary processes are properly arranged for allowing the tongue that freedom of motion, and that variety of form and position, by which the human voice is articulated into speech. The concavity in the roof of the mouth is the great

mould, and the tongue is the principal instrument, by which articulation is performed. The lips, however, have a share in speech, and a share that is quite in unison with their moderating influence upon the jaws—have the charge of the vowels and labial consonants. Here a wide and delightful field opens up, which we must for the present beware of entering, for much of a higher order remains for discussion. How entertaining it would be to trace the gradation in voice, and in articulation, from the lowest respiring animal, up to man the highest —to trace the gradual evolution of the human jaws, and the gradual acquirement and improvement of speech, from infancy upwards—and to sum up and arrange the multitude of articulate sounds which the human mouth is capable of uttering! For speech, respiration requires to be great, in relation to the size of the mouth—mark how impeded respiration unfits even a human being for speech. In the lower regions of respiring animals, the mouth is large, and the respiration small; whereas in the higher regions, the respiration is comparitively great, and the mouth small. Social ani-

mals are generally furnished with small mouths, that no hinderance might be given to conversation, where animals are disposed to it, and stand so much in need of mutual aid; whereas ravenous, solitary, insociable animals, have large devouring mouths, little adapted for articulation.

NOSE.

As the nose is the proper entrance into the respiratory organ, and as the energy is proportional to the respiration, so the size of the nostrils must stand indicative of the whole energy of the animal. By the nostrils are to be understood, not merely the two external orifices, but also the two nasal passages in their whole extent. Although the nose is less complicated in structure, in function, and in physiognomical expression, than the mouth, yet, as breath is more nearly connected with life than food, and as the chest is situated above the belly, and the nose above the mouth, so the nasal organ must indicate qualities of a stronger and more digni-

fied nature, than animal appetites and passions—indicates, indeed, that very energy which it is the great business of the passions to rouse into action. The nose may be said to occupy all the upper jaw above the roof of the mouth, or the floor of the nostrils. Above, it is separated from the brain by the cribriform plate of the ethmoid bone, and by the clynoid processes and sella turcica of the sphenoid bone; on either side it is bounded by the orbits and by the cheek bones; below it rests upon the roof of the mouth. Thus the nose forms a long arched vault, broad below, narrow above, the anterior extremity of which looks into the atmosphere, the posterior into the gullet. The nasal cavity also extends on each side into the maxillary caves, upwards into all the spongy bones and frontal sinuses, and backwards into the cellular structure of the sella turcica. Thus the nasal cavity is extended and enlarged in every possible direction, and has actually by its encroachments hollowed out and undermined the whole fabric of the upper face. Thus the two openings, mouth and nose, which lead into the two great vital organs occupy nearly the whole face.

While the mouth, not in virtue of itself, but of the alimentary organ to which it gives entrance, indicates the incitement to action, the nose tells what can be done, not in virtue of itself, but of the lungs to which it gives entrance. The nasal apparatus is the porch of respiration, and the sense of smell is the sentry; hence it may be laid down as a general rule, that atmospheric air is wholesome or unwholesome, in proportion as its smell is agreeable or disagreeable. As odorous effluvia tend upwards, so the nose comes to be percipient of substances entering the mouth; and it is found to hold that food is wholesome or unwholesome, in proportion as the smell is grateful or ungrateful. The sense of smell, therefore, is superintendent of the breath, and assistant superintendent of the food. The nose then stands in a double relation—in the relation of porch, and sentinel to the lungs, and in the relation of assistant sentinel to the stomach, and assistant forager to the mouth. The nose, in its capacity of giving passage to the breath, indicates energy in general; and in its capacity of assisting and watching over the interests of the alimentary organ, indicates the

external application of this energy, towards the acquirement of the necessaries and comforts of life.

The larger the nostrils, the greater must be the current of breath, and consequently the more energetic the individual. The current of breath indeed determines the size of the nostrils, just as a river determines its own channel. As the nostrils, however, being part of an accurately adapted machine, were originally constituted sufficient for the breath, and gradually enlarge to the increasing current of respiration, so a person is apt to conclude, that the passages and channels determine the currents, as much as they determine the passages and channels. But when a flood carries down the banks, and an energetic enterprize throws wide the nostrils, then it is seen whether the channels determine the currents, or whether the mighty currents of a river, and of respiration, are willing to acknowledge any barriers, or any limits. As breath is indispensable to life, Nature has made more orifices than one into the lungs. The nostrils, however, are the proper entrance for the

breath, and the more the breath passes through them, the more genuine is the energy, and the more does it pursue an active channel; whereas the more the breath passes through the mouth, the more does the energy take a passive channel, and expend itself in appetites and passions. Hence openness of mouth, much speech, and much blustering, are no tokens of either energy or courage. The nostrils, as conduits of air to the lungs, may enlarge in two directions—in width and in depth; but as it is a matter of little consequence to the lungs, whether the passages be deep or broad, provided they be sufficient for the current of air, so the shape of the nostrils, as well as the size and shape of all the rest of the nasal apparatus, belong not to respiration, but are devoted to foraging, and of course indicate not the quantity of energy, but its application in pursuit of prey.

The olfactory structure may be divided into internal and external—into what lies behind, and what projects. The size and shape of the internal structure, where the olfactory nerve resides, and receives sensations, indicate how

much and what kind of energy are devoted to the purposes of smell, while the external projecting structure, which merely conducts the odorous effluvia to the nerve, indicates how the energy so devoted is applied to practice.

Having then in the first place supposed all the projecting nose pared off to a level with the plane of the face, we find that the acuteness of smell is proportional to the size of the olfactory apparatus which remains; and as the proper object of this sense is prey, so also predaceous energy, or animal courage, is proportional to the size of this internal olfactory apparatus. Accordingly, animals of the order *feræ*, in which animal courage is at the highest pitch, are furnished with large olfactory apparatus; accordingly also, the negro, who surpasses his white brother, both in acuteness of smell, and in animal courage, has comparatively wide nostrils, and large spongy bones. As a given increment to the breadth would give a greater addition to the size of the nasal structure, than a similar increment to either of the other two dimensions, and as the quantity of odorous effluvia that impinge at once upon the spongy

bones, where the olfactory nerve is spread out, depends chiefly upon the breadth of the nasal passages, so the breadth of the nostrils must indicate the force of the sensation, and of course the force of the predaceous energy. As the upper spongy bones are the chief seat of smell, and as in man they occupy all the space between the orbits, so the breadth of the upper part of the nose denotes the animal courage. The eye is a predaceous organ, as well as the nose, but is a step above it, and gradually encroaches upon it, as the animal nature yields to the moral and intellectual. Animal courage is indicated by a broad nasal structure between the orbits, whereas moral courage is indicated by approximation of the eyes, for the sake of anteriority of aspect. Where this approximation of the eyes, or narrowing of the nose, is carried too far, as in apes, then the predaceous character becomes enfeebled; for eyes were never intended to supersede, but merely to assist the nose, which is the great radical predaceous organ, and holds its commission from the grand vital organ itself. As the cheek bones are attached to a process arising from the max-

illary caves which communicate with the nostrils, so the distance from cheek bone to cheek bone also bespeaks force of predaceous energy. Prominent cheek bones indeed indicate the application of that energy in rapacious pursuits, for the temporal muscle passing down underneath the zygomatic process of this bone must also influence its prominence. As odorous effluvia ascend, so the greater the height of the olfactory apparatus, the longer shall the sensation continue. Perpendicular extent of nasal region therefore, having continuance of sensation for its object, must indicate perseverance of predaceous energy. It is indeed on account of this ascending motion of the odorous particles, that the olfactory nerve is the highest of all the nerves that issue from the brain, and that the nose stretches so far up in the face, vying in altitude with the ears and eyes; while the situation occupied by the external nasal orifices, and the distance at which this sense can perceive an object, give the nose a rank only intermediate between the mouth and the ear. Projection of the olfactory region seems to be just a stretching forward of the olfactory organ

toward the object of prey, for the purpose of smelling it out, and seems to indicate keenness and promptitude of predaceous energy. An extension of the olfactory structure from before to behind seems indeed to be calculated for speed. It seems to be in virtue of the jutting part of the human nose, that the olfactory region is allowed, without making any sacrifice of promptitude in smelling, to fall into a perpendicular plane with the other features.

The nose could smell without the projecting part, though by no means so acutely, or so determinately, in the same way as a person could hear, though not so distinctly, without external ears. As the duty of the auricle is to collect the rays of sound, so the duty of the external nose is to collect the odorous effluvia. As physiognomical indications are more favourable in proportion as the construction of organs is more suitable for the performance of functions, so the more this nasal prominence is calculated for catching odorous effluvia and conveying them to the nerve of smell, the better shall be the practical application of the predaceous energy.

Although the medium of sensation between the object and the organ always proceeds from the object to the organ, yet the organ, in proportion to its keenness, stretches out for the reception of odorous effluvia with the very same size, and shape, and direction, of nasal orifices, as if a smelling power had proceeded from the nose to the object. Let us then keep in recollection, that prey or food is the proper object of perception to the nose; that there is a close connexion in structure, and an intimate consent in function, between the mouth and the nose; that in those stages of animality, where the mouth has to perform seizure of the prey, there the nose performs the part of scenting it out; nay, the mouth cannot grasp at an object without the nose standing over, with all its olfactory apparatus, to ascertain that the object is salubrious; and that as soon as the mouth is saved from the duty of foraging, and adapted for mere eating, so soon does the nose become adapted for mere superintendence. But the human nose, although it is mainly devoted to the superintendence of food entering the mouth, is not closely limited to this duty,

but enjoys a less or greater range of perception of objects around.

For superintending the food entering the mouth, the nasal orifices should be directed downwards over the mouth, as if they were its chimney. This direction is not so much for catching odorous particles in their ascent, as for making the stream of inspiration pass the mouth. As the smoke is more completely conducted from the fire in proportion as the chimney stretches over and approaches the grate, so the more the nasal orifices stretch over and approach the mouth, the more completely shall the odorous effluvia be conducted along the nasal flue. The more, therefore, the nasal orifices take an oral direction, and the more the apex droops, and directs the breath closely by the mouth, the more keen is the predaceous energy in whatever pursuit. In children, the nose never droops, although it often shows a tendency downwards, nor in advanced life does this organ ever droop, except in people of keen plodding dispositions. Thus we see, that a drooping nose is a most austere selfish feature,

with which no man dare trifle. Hence it is, that a drooping nose is seldom seen to hang from the brow of a poet. Where, on the contrary, the plane of the nasal orifices is raised from an oral direction to a forward aspect—is raised from a rivetted devotion to the mouth towards the world—there we find the predaceous energy to have thrown off the keen plodding selfish cast, and to have assumed the easy social. Where the wings of the nose are drawn upwards, giving each nasal aperture a lateral aspect, there we have the predaceous energy putting on a contemptuous cast; indeed we find the elevators of the upper lip, and wings of the nose aiding, if not gradually producing, this lateral aspect. Where the plane of the two nasal orifices is at right angles to the plane of the face, there we have a nose sufficiently watchful of the interests of the mouth, and yet receptive of odoriferous impressions from without.

As the current of smoke is more regular and determinate, in proportion to the height of the chimney, so the current of odorous effluvia is

more regular and determinate, in proportion to the height of the nasal flue. The greater the extent of nose, therefore, from the junction with the brow to the apex, the more persevering is the character. Thus we find that the height of the external nose, corresponds in physiognomical expression, with the height of the internal. The junction of the nose with the brow, marks the flow of the intellectual faculties, along the predaceous channel. The more directly the nose falls from the brow, or the more imperceptibly the brow dips into the nose, the more prompt is the mind, not necessarily, however, the more profound; whereas the more the nose, from a sinking of the top of the ridge, seems detached from the brow, as if there were a break in the current, the more irresolute is the character, and the more slow of apprehension. The relation of the nasal ridge to the frontal plane, will claim attention when the brain is under discussion.

The relation of the nasal ridge to the average plane of the face, gives the angle at which the funnel is held out for the reception of odorous

effluvia. The more the nose stands forth from the general plane of the face, the more does the predaceous energy, instead of dribbling down the face, flow forward in a full energetic stream, upon extensive objects of pursuit. In this measurement of projection, the whole line of the ridge must be understood to be straight; for the different parts of the ridge are so different in force of expression, that the average line in all noses would be far wide of the truth. The line of the nasal ridge, therefore, comes to be most expressive—indeed forms the outer boundary of the funnel. We have already remarked, that a sinking of the ridge at its junction with the brow, indicated irresolution. We now farther remark, that a sinking of the ridge at any place indicates irresolution, the more inbred or constitutional, the nearer to the root or junction with the brow; whereas the nearer the depression of ridge lies to the apex, the more is the irresolution of an acquired or accessory nature—enters the more into the formation of the outward character. What applies to partial depression of ridge, applies to partial elevation on substituting an enterprizing turn for irresolution.

The convex ridge, commonly called Roman nose, denotes an enterprizing character; but that nose would have been much more energetic, had the same rate of elevation with which it set out from the brow been maintained to the apex. The convex ridge, however, does mark out a naturally enterprizing character, and is generally accompanied by divarication of the knees—that genuine divarication which does not depend on a bending of the bones, but seems to be produced by the fascial muscle, which braces up the muscles of the thigh. This accompaniment will claim farther attention, when we come to the legs. The acquiline nose marks a character, whose flow of predaceous energy receives at its very exit a selfish oral direction.

As a broad olfactory structure, from being calculated for strong sensation, indicated force of predaceous energy, so a broad external nose, from admitting a large stream of effluvia, indicates a vigorous application of this predaceous energy; and the higher up the expansion, the more inbred is this animal boldness; great breadth

of the upper part of the nose, is indeed a characteristic of the *feræ*. The reason that the upper part of the nose is more radical than the lower, is principally because the upper part is constituted of bone, the lower merely of cartilage. Although this division belongs more to the anatomist than to the physiognomist, yet as the comparative quantity of bone and cartilage may be computed during life; and as the physiognomist may have frequent occasion to contemplate the sepulchral ruins of former energy, tossed up from their dark abode, or to walk through the museum, amongst the more sightly, but yet solemn display of what was once energy, as well as passion, and feeling, and intellect, so this division into bone and cartilage—into solidity and softness—is highly worthy of attention. The more the nose is constituted of bone, the more is the direction of energy fixed, determined, constitutional; whereas the more the nose is constituted of cartilage, the more does the direction of energy depend on individual exertions. The cartilaginous part of the nose seems to be to the osseous, what the lips are to the jaws. The more soft and pliant the cartilaginous part of

the nose, the more loose and unsteady is the direction of predaceous energy. On the contrary, the more firm and elastic the cartilaginous part of the nose, the more steady and determined is the current of predaceous energy. A nose composed of firm elastic cartilage recovers itself from every pressure, however frequently repeated, and maintains a straight attitude. A good nose ought to have a firm, and a regular formation to the very termination of the apertures, which indeed are by far the most expressive part of the nose. The wings of the nose are furnished with muscles of compression, and of expansion. Compression indicates a prudential restraining of the predaceous energy; expansion indicates loose given to the predaceous energy, and indeed is produced by the same muscles, which throw the upper lip into snarling.

THE EARS.

The mouth and nose we have found to be mere animal organs, whose perception even

in the highest state of organization is slow, and whose range of perception is limited. In that stage of animality, where ears and eyes have not yet come forth, there is locomotion, but of the crawling kind. If the perception of prey be slow and limited, the perception of danger is still slower, and still more limited, so that no interruption may be given to the work of mutual depredation. There the warning and the blow come together—there the predaceous animal has no sooner felt than has seized, and has commenced to devour its victim. The one is furnished with no hearing organ to give warning of approaching danger, nor is the other furnished with a seeing organ to discern prey from a distance. Even over that blind, and deaf, and dumb range of the animated world, we may remark the superiority in power, that is afforded by superiority in organization. But the addition, to touch, and taste, and smell, of hearing and seeing, gives a new and a superior stamp to the character, and carries the earnest of superior faculties, and of superior powers. Here the breath has acquired an appropriate and determinate channel; and, as the auditory and ocular organs

advance in structure and function, the current of breath increases, and its channel becomes arranged for the formation of voice, and branches off through the mouth, for the double purpose of getting this voice articulated into speech, and of gaining an additional aperture of security. Unless ears had been constructed, sound, and voice, and speech, would have been to us a nonentity. Hearing seems to be just the perception of distant impulse or percussion. As all radial emanations diminish in a geometrical ratio to the distance, so, for the purpose of giving perception of distant impulse—for the purpose of giving warning of approaching danger—Nature required to erect nice machinery, and to spread out a web of most acute sensibility. Prior to the ear, the death-blow must have too often accompanied the warning, and precluded the exertion of the pursuit, and the exertion of escape, together with the improvement resulting from such exertions; and even where an accidental contact without a seizure announced prey and pursuit to the one, and alarm and retreat to the other, yet the pursuit is a blind groping in the dark, and the retreat is just a

start from the contact, when, in an instant, the prey and the danger are alike forgotten. But when we ascend among the hearing and the seeing tribes we have fair sport—a fair alarm and flight on the one hand, and a fair discernment and pursuit on the other. That danger is the most appropriate object of perception to the hearing organ, and prey to the seeing, is proved, not only by observations on the lower animals, and by the general position of the ear, but also by our own consciousness. Thus, when greatly apprehensive of danger, we dare scarcely turn our eyes to the direction, whence the terrifying sound proceeded, while our ears are all the while erect, and eager to catch the smallest vibration. With such eagerness of ear, and under such perturbation of mind, there is little wonder that cowards so often pass through terrifying scenes, while heroes are at so great loss for opportunities to display valour.

As the nose required to be divided into internal and external, so the ear must also be divided into internal, where the auditory mechanism is erected to increase, and the

auditory nerve to receive, sensations, and into external, by which the rays of sound are conducted to impinge upon the tympanum. The deep caverns, and tortuous windings of the internal ear are not only beyond the reach of the physiognomist, but even almost bid defiance to the less delicate researches of the anatomist. From this circumstance arises our ignorance of the structure, of the physiology, and consequently of the physiognomy of the various parts of the internal ear; for little more of its physiology is known, than that the structure is more complicated in proportion to the height of the animal in the scale of living beings. This curious structure may perhaps become a rich mine of posthumous physiognomy, by which the hidden treasures of the soul may be brought to view, when the ear shall be deaf to its own praise. An exploring anatomist might make interesting discoveries in this region of music.

How music produces its astonishing effects upon the mind, is still a mystery. That all instrumental music is imitations of vocal, that the voice is formed in the region of animal energy,

and the articulation in the region of the animal appetites and passions; that every loud and sudden sound startles the boldest animal, which depends for safety upon its own immediate exertions—startles even man himself, in the midst of all the protection, with which he is surrounded; that, moreover, the receptacle of these naturally startling sounds, is the very sentinel appointed to watch over personal safety—all these tend to dissipate the wonder, if not to clear up the mystery, of musical enchantment. Nay, when it is recollected that music will not associate with timidity on the one hand, or with fierceness on the other, and that safety and sociality are its essential requisites, need we be astonished at the spirit, enthusiasm, intoxication with which music at times inspires the human mind. This heavenly harbinger will not consort with fear on the one hand, or with the angry passions on the other, so that no ravenous or timid animal can sing, and under terror or rage no animal, however musical, can make the voice to linger on the strains of music. It is in virtue of wings, which afford comparative safety, that there are so many musical chirpers

among the feathered tribes; accordingly, there are here no flapping ears held out for the reception of alarm. Among terrestrial animals we hear no music except from the human race, below whom there is either dumbness, or fierceness, or timidity. As long as the external ear sprouts up in all the fear and alarm of sentinels at their watch post, music can have no place; for every sound is a monitor of danger. It is not until the external ear has subsided and settled around the ear tube, and fear melted down into sensibility, that there is sufficient self-command and composure for employing those natural exciters of alarm, for the purpose of rousing our sensibility, and awaking all the energies and faculties of the soul. Thus we find that the ear is a passive organ; and it is worthy of remark, that as a consent was established between the eye and nose by sympathy and connexion, in structure and function, so a consent is established between the ear and the mouth by sympathy, for when the ears are eager listening, the mouth becomes open, and by connexion in structure, for the Eustachian tubes from the ear open into the back

part of the mouth. Thus, while the mouth represents the passive voice of the animal verb, the ear represents the passive voice of the mental.

The size of the ears, whose hearing is increased by size, and whose office is to give warning of danger, must, in the lower tribes, merely refer to the degree of timidity of character. Accordingly, animals possessed of large external ears—of large funnels for the reception of alarm are timid. To ears pointing upwards, every sound is a monitor of alarm, although courage and familiarity with the sound, may in many animals forbid startling. Keeping the long flapping ears out of sight, there is a beautiful gradation in the size and shape of the external ear, from the lowest monkies, up to man. The macaques and guenons have the ears stretching determinately upwards, with a bestial luxuriance. The sapajous and orangs have ears approaching not only to the size and general shape, but also to the configuration, of human. The more the ear settles into a rounded shape, and is arranged around the meatus,

the more has rank fear been refined, or intellectualized into sensibility. As long as there was danger, the ears had enough to do in watching over personal safety; but no sooner is safety added to sociality, than fear gradually melts down into music, sensibility, and the finer feelings. Thus the original function of the ear is not given up, or even changed, but merely improved. All the organs of the body, in the gradual progress of animality, gradually fall as close to the general surface, as is compatible with their functions. Nature seems to be gradually bringing the body into the least possible circumference, as if she were aiming at economy of room. The ear however has not subsided at random, but into a configuration the best calculated for catching, and at the same time making an election of the rays of sound, as they brush along from all directions. In the lower stages of animality, both the ear and the eye are constituted as receptive as possible of all the rays auditory and visual, but in the higher stages of animality, this receptive quality gradually becomes arranged into elective. As iris, and eye-lids, and eye-brows come to sur-

round the pupil for excluding superfluous visual rays, so the auricular funnel, in falling close to the head, has become arranged into the helix and antihelix, the tragus and antitragus surrounding the concha, and excluding superfluous auditory rays. The lobe—that pendulous part peculiar to the human ear—has the appearance of a weight appended for preventing too much luxuriancy upwards, and may be said to represent the intellectual ballast for bearing down the light bark of fear, from being tossed upon every wave, and driven about by every squall, into the weight of sensibility, so that she may draw a sufficient depth of water for enabling her to sail steadily and smoothly, over the boisterous ocean of human life. Not only the more closely contracted and gathered the external ear is around the concha and meatus, but also the more these are themselves within limits contracted, the more refined and exquisite is the mental sensibility, but at the same time the less is the alacrity, as if the human concha, notwithstanding all its surrounding ridges, were acting the bestial funnels of alarm. The more the external ear is cartilaginous and

elastic, the better are the auditory rays conducted to the tympanum, and the keener are the sentimental feelings. Thus domestication, by bringing the bestial ears into comparative disuse, renders them soft and pendulous.

Timid animals, which flee from their pursuers, have their ears directed backwards. It will be afterwards seen, that the eye, whose more appropriate object is prey, deigns, as a faithful member of the corporal community, to direct the pupil backwards to keep watch along with the ears, in those animals whose weakness and timidity forbid offensive operations; so the ears, in courageous animals, forget their natural defensive office, and bravely turn forward, along with the eye and the nose, towards the object of pursuit. The human ear, from the open part being before, indicates the human species to be courageous, to be naturally pursuers of prey. The more the human ear keeps straight, and the less it tends to the oblique direction, the greater is the courage.

In the lower animals which walk horizon-

tally, and even in man with that posture assumed, the ears hold the most elevated situation of all the senses, for the purpose of acting the part of sentinels to the body. In the change from the quadrupedal to the erect posture, the ears are thrown from the most conspicuous situation to the back ground, as if they had retired from the busy scenes of life, for the purpose of hearing in composure the song of past alarms. Lodged securely in the back ground, and in the rocky portion of the temporal bone, the ears may now indulge in the refined delights of music and sensibility. The cranial situation of the ears gives them an intellectual title, puts them upon a rank with the eyes. The petrous portion of the temporal bone, from having an invariable situation, is a lateral landmark between the face and the head. On arrival at the brain, we will see that in the progress of animality, the towering head of intellectual comprehensiveness becomes a suitable substitute for the elevated ears with their never-ceasing emotions of alarm.

THE EYES.

Taste, Smell, Hearing, and Seeing, seem to have gradually arisen out of the primitive sense of touch, not so much to supersede it, or even to perform any independent office, as to act the part of prompt assistants. From the number and organization of the senses might be formed a gradation scale of living beings. Animals are endowed with corporeal and mental qualifications, in proportion to the number of the senses; and where there exist all the five, the highest number at which animality has arrived, then the corporeal and mental qualifications keep by the ratio of organization, that is, of aptitude for the performance of functions. Man is endowed with all the five senses, in the hitherto best state of organization; but the gradual accession and improvement of senses in proportion to the progress of animality, forbid the idea that the sensitive organs, any more than the sensorial, have arrived at completion.

Vision, of all the senses, has been the last to

spring up in the progress of animality, and is in any animal the last of the senses to begin duty, and to arrive at maturity. Colour is the peculiar object of perception to the eye, and it is only by the co-operation of the other senses, that the eye can perceive any other quality of matter. Vision, without the assistance of touch, the fundamental sense, would be but a gaudy picture—would be the shadow without the reality. But the eye, trained up under the direction of touch, is at once the most prompt, the most comprehensive, and the most accurate organ of sense. The curious and wonderful discoveries that the eye, with a little assistance, has made, and is yet making in the new microscopic world, which lay for so many ages unheeded and unsuspected, can best tell to what keenness the discernment of the eye can be carried; and the science of astronomy, even in its present incipient stage, can best chalk out the utmost range of vision; and the progressive state of that sublime science can best point out where you may dare to write your *ne plus ultra*. The eye may almost be said to give us a slight degree of omnipresence, and makes

us somewhat celestial, even before we take our flight from this terrestrial perch.

Although we formerly found the mouth and nose occupying nearly the whole face, yet when we attend to the eyes, and especially when we look at the extensive sockets, from which the whole ocular apparatus has been extirpated, we begin to find that the eyes occupy a most exalted, and a most extensive portion of the face. The nasal apparatus, which we formerly found stretching up to the very brain, seems now to be little more than the interstitial space between the two orbits; and whereas the nose merely stretched up to the precincts of the brain, the orbits actually encroach upon its very compartment, so that the eye-ball lies partly imbedded in brain, and partly in face. The eyes have their seat in a semicircular niche at the bottom of the cerebral throne, and in the polity of the animal economy, hold the office of prime minister. The number of facial bones contributing their processes to the construction of the orbit, point out the eye to be a central organ to which the other senses pay homage. Were we at this mo-

ment to see a face for the first time, our attention would be arrested by the eye—a thing so brilliant in the midst of dulness, as if it were either a little fire, or a window opening into a luminous apartment. But although the eye, from its superiority in situation, in structure, and in function, is a more engaging, and a more expressive feature than the nose, yet the nose, from being more central, and from being connected with the great vital organ, is a more radical feature. The eyes may be viewed as a superstructure raised upon the nasal basis—as the moral reared upon the animal. Whenever the intellectual system is set adrift, the character and conduct are delivered over to the direction of the predaceous energy of the nose above, and to the impelling force of all the animal appetites and passions of the mouth below—there is a reduction from the moral character represented by the eyes and ears, to the animal character represented by the mouth and nose.

From the history of animals in the wild state, where every organ is employed almost exclusively for its own peculiar purpose in the ani-

mal economy, we learn that the appropriate office of the eye is predaceous. The eye, therefore, must rank in kind of function along with the nose. This consent of operation, between the eye and the nose, Nature has insured by establishing a sympathy between the two, and by making the same fluid moisten them both. But although the eye co-operates with the nose in discerning prey, and thus may be said to perform the same kind of function, yet in degree of function the eye far surpasses the nose. The nose is the active voice of merely the animal, but the eye is the active voice of the moral. While the nose can do little more than smell out the food at but a little distance, the eye has a range of perception bounded only by the horizon, and a field of prey that scarcely knows limits. The predaceous tendency of the nose is of the nature of instinct; and those animals which possess no higher sense, have nothing but instinct for their guide; and the more this sense predominates, even after ears and eyes have arisen, the more is the animal still under the guidance of instinct. Nay, it is not until we arrive at the human race, that we find

the sensorial organ with its two senses, take the reins of government into its own hands. It is in virtue of the predaceous nature of the eyes, that they have their seat in front, directed towards their objects of pursuit. Upon the same principle that the predaceous eyes, as contra-distinguished from the timid ears, have their seat in front, have animals their eyes more in front in proportion to their boldness. Accordingly, mankind as a race are courageous. As we formerly found, from observations on the lower animals, from the general position of the ear, and from its becoming, under apprehension of danger, erect and eager to catch the smallest vibration, while the eyes dare scarcely turn to the direction whence the terrifying sound proceeded, that danger was the proper object of perception to the ear, so we now find that prey is the appropriate object of perception to the eye, not only from observations on the lower animals, from the general position of the eyes, but also from our own consciousness, for in the pursuit of our foe, we let sound go to the wind, but dart forth the eyes from

their sockets, and from their coverings in all the eagerness of attack.

As the ears are directed forward in accompaniment with the eyes and nose, in animals which pursue, so, in animals which are pursued, the eyes look backward in accompaniment with the ears. Now, although there is not such a difference in situation of eyes, between any two men, as between the lion and the hare, yet there is a considerable range of variety from human orbits of the most forward aspect, to those of the most lateral. This lateral tendency of orbit, is just an effort toward that complete lateral direction which characterizes the cowardly tribes. It may therefore be laid down, that the more the anterior openings of the orbits are directed forward—the more the temporal sides of the orbits stretch forth, and prevent the eye from glancing sideways or backwards—the more natural boldness does the individual possess. On the contrary, the more the external openings of the orbits are oblique—the more the temporal edges of the orbits recede, and admit rays from behind

and from either side to enter the pupil—the more natural timidity with all its train, does the person possess. The timidity expressed by this conformation of orbit is merely natural; for man is so much the thing of circumstances, and his character is so influenced by precept, example, and habit, that an artificial boldness may supersede a natural timidity, or even a natural boldness may melt down into an artificial timidity. Here indeed education has had a double task to accomplish—has had a lesson to unteach, as well as a lesson to teach, and the result of all the labour is an artificial structure on an insufficient foundation. The oblique-eyed soldier may strut with the best of them on the field of parade; or may even be hurried along with the throng into the hottest of the battle, just as cowardly horses may be made to rush on in troops; or when danger and death are impending, he may act the part of a desperado, just as the hare in the last struggle turns its teeth upon its devourer. But put this man to a dangerous enterprize where he is not urged either by example, necessity, or desperation, and then it will be seen whether this artificial

hero will abide by the transformation wrought upon him by human education, or, shaking off all the flaming accoutrements of art, will throw his safety into those nimble heels which provident Nature has provided for his escape.

We formerly found that breadth of the upper part of the nose bespoke animal courage. We now find that approximation of the eyes towards each other, indicates moral courage. Thus in the progress of animality, animal fierceness gradually gives way to the less daring but more efficient moral courage. But in this gradual encroachment of the ocular region upon the nasal, Nature aims at no more than to bring the eyes into a forward aspect, and into a unity of vision. The eyes were never intended to supersede, but merely to assist, the nose. Accordingly, whenever the approximation proceeds beyond the attainment of anteriority and unity of vision, then the radical animal boldness derived from the great respiratory organ—the source of vitality—becomes enfeebled, and sacrificed to the moral courage derived from the brain. When the breadth of the nose, and the

proximity of the eyes to each other, are properly balanced, so that unity and forward direction of vision are gained on the one hand, and acuteness of smell and abundance of breath are maintained on the other, there we find a being designed by nature to be a hero.

While the conformation of the orbits, in proportion as they afford scope to the pupils, indicates the natural tendency of character, the actual direction of the pupil affords a positive indication of the moral courage. Where the pupils keep lurking about the canthi for the purpose of stealing side glances, there is a tendency to the lateral direction observable in cowardly animals, along with an effort at concealment; for while the eyes are taking their range of vision on either side, the head maintains the forward direction, and gives the appearance of no notice being taken of what is going on around. This turning of the pupils from side to side indicates suspicion, of which timidity is a principal ingredient. A turning of the head from side to side, just makes up for the want of lateral eyes, without any effort towards concealment, and of course indicates sheer cowardice.

An upward direction of pupil, indicates pride. An upward aspect of countenance indicates pride along with ostentation. A downward direction of pupil indicates humility. A downward aspect of countenance indicates homage, reverence, adoration, and whatever implies self-abasement, or professed humility. Rolling of the eye-balls indicates unsteadiness of character. That pupil which holds a steady central position between all these directions, is the best indication of a firm determined character. "Let thine eyes," says Solomon, "look right on, and thine eyelids look straight before thee."

The brilliancy or lustre of the eye depends not upon the tunics, but upon their plenitude with humours within, and lubrication with lachrymal fluid without. If you take a dead eye and press it gently behind, so as to fill the cornea, an artificial brilliancy is produced; if the pressure be increased to the distention of the cornea, a turgid dimness, more ghastly than the dimness of death, is again produced. If you cut out the half opaque cornea, and then stretch it gently, it immediately becomes transparent; if you

stretch it forcibly, it immediately becomes opaque. Thus dimness is caused by relaxation or distention of the cornea, and brilliancy by plenitude. Where the humours are deficient there is dimness; where they are abundant there is brilliancy; where they are superabundant there is again dimness. The intimate sympathy subsisting between the brain and the humours of the eye falls under pathology. The intimate sympathy between the condition of the mind, and of the humours, is sufficient for physiognomical purposes. How, under mental depression, the eye becomes lax and dim, but how it starts into keenness and brilliancy, the moment the mind enters upon any sprightly occupation! How, by a paroxysm of mania, the eye brightens into a blaze of irradiation, but how suffused with a dim ghastly glazedness, where extreme lunacy has overwhelmed the mental faculties! The keen, the piercing, the darting, the penetrating, the killing eye, is nothing but an eye accurately and copiously filled with humours, and lubricated with lachrymal fluid. Eyes, that are much employed in the keen examination of objects, are bright and glistening;

whereas the eyes of the scientific and literary, whose pursuits, being almost purely intellectual, do not require much ocular discernment, are somewhat dull. The eyes are not indebted for brilliancy to the abstract thinking of the brain within the scull, but to that mental exercise in which a man faces the world, and plays his part among his fellows, chiefly through the medium of the eyes.

As anxiety not only bedims, but also diminishes the eyeball, indeed bedims by so far diminishing, and as cheerfulness not only brightens, but also fills and enlarges the eyeball, as moreover the large eyeball with convex cornea is fitted for seeing near objects, and the small eyeball with plane cornea for seeing distant, so a cheerful, social disposition must in the course of years, and of life, and of successive generations, produce large eyeballs; while an anxious, melancholy and reserved disposition, must in the course of time produce small eyeballs. As near objects require great refraction of light, and as it is more refracted in proportion to the depth and con-

vexity of the refracting medium, so a large eyeball and a convex cornea, are the most suitable for the free, open, social man, whose ordinary objects of vision are his fellows around, and things immediately before him. In consistency with this, we find that young people, whose juices abound, and whose dispositions are generally sprightly and social, have comparatively large eyes, which are liable to convexity and short-sightedness. On the other hand, as the rays proceeding from distant objects, require comparatively little refraction, so a small eyeball and plane cornea, are the best calculated for that wretch of anxiety and gloom, who is always looking eagerly beyond the present, for what is to come next, and thus losing the enjoyment of all—actually keeping his eyes fixed on the most distant objects before him, and thus seeming often to be staring into vacancy. In consistency with this, we find that the aged, whose juices are scanty, and whose dispositions are anxious and fretful, have shrunk eyes, which are liable to planeness and long-sightedness. The large eye, therefore, marks the social disposition. Here the talkative, the ceremonious,

the obsequious, the vain, and the artificial sociality, must be distinguished from the genuine. Let it be understood, that sociality does not reside in eyes or depend on their size—that they are not the cause, but the instruments, and the indications of sociality. The eyes may be completely awanting, and yet the internal cause that would have made them if present, to expand in all the fondness of sociality, remains unabated within.

Projection of eye is just a stretching forth of the eye towards the object, for the purpose of discerning it, and bespeaks eagerness of mind in whatever pursuit. Recession of eye, on the contrary, is just a retiring of the eye within its socket, for the purpose of getting a more deliberate and unmolested view of the object. Even under temporary eagerness, the eyes project beyond their habitual position; and under temporary listlessness, become more deeply sunk in the socket.

In all this account of the direction of the pupil, of the size of the eyeball, of its brightness,

and of its situation in the socket, we have been taking for granted that the eyeball was well lubricated with tears. The lachrymal gland occupies a notch in the orbit, at the upper and outer side, and pours down its secretion of tears upon the eyeball, through a series of parallel ducts running along the upper eyelid, and opening a little above its tarsus or edge. The gland, in a physiognomical point of view, is an organ of sympathy, for that fine feeling promotes the secretion of tears, whereas, in the angry passions, and in those mental diseases which are devoid of sympathy, there is deficiency of lachrymal secretion. But the gland must not be viewed as the seat of sympathy, but merely as an organ which Nature has subjected to the impulse of that fine feeling, for the purpose of giving relief to the mind. Whether we consider the upper eyelid to have been made for the lachrymal gland, or the lachrymal gland for the upper eyelid, we must now consider them both as entering into the composition of the apparatus for lubricating with tears the surface of the eyeball. The lachrymal gland secretes the tears, and the up-

per eyelid by repeated winking spreads them, and in spreading promotes their farther secretion. In ordinary circumstances, the under eyelid takes no active part in this lubrication; but whenever the eye is threatened with an inundation, then the lower lid co-operates with the upper to prevent temporary blindness. But the lower lid, although not ordinarily employed in spreading tears, yet forms a part of the lachrymal apparatus. By the tunica conjunctiva, a contrivance of that simplicity and elegance which characterize the works of Nature, there is formed in front of the eyeball a bag which keeps the tears to the scene of action, and prevents any substance which may have found its way into the eye, from passing beyond the range of the eyelids. It is this conjunctive tunic chiefly which makes the under eyelid a party in the lubrication of the eyeball. That the main and primary office of the eyelids is to clarify the eye for vision, by continually moistening and washing the cornea, appears from the eyes of fishes, which are ever exposed to a watery element, being destitute of lids. The eyelids, in winking, do to the eyeball what the

tongue by its motion does to the mouth—both spread the lubricating fluid over the surface of the organs, to which they are respectively attached. While the mind is cheerful and active, the secretion of lachrymal fluid, as also of saliva, is abundant, and the upper eyelid, as well as the tongue, are ever and anon in motion. Whereas during melancholy, these secretions are scanty, and both the tongue and the eyelids neglect their duty. When the mind is struggling to get out of a difficulty, the eyelids wink rapidly, for the purpose of rendering vision as clear as possible. Contemplate the eyes of draught-players when in keen contention for mastery.

Before entering upon the secondary offices of the eyelids, we must advert to that most important spot, the pupil, through which all the pictures of external things are transmitted to the retina. For regulating this transmission of rays, three different apparatuses have been constructed around the pupil, as if it were the centre of so many circles. It is closely surrounded by that delicate beautiful mobile belt

of radial and circular fibres, the iris; it is less closely surrounded by the eyelids; and as if this little black spot had engaged more than ordinary solicitude from Nature, there is thrown over the whole an elegant arch of hair. What could more beautifully and more tenderly express the providential care, which Nature exercises over her creatures, than that apple of the eye, around which she has with so much earnestness thrown another and still another fence. As the iris forms the border of the pupil; as vision is more distinct, the more certainly and readily those rays which do not obtain direct admission to the retina are absorbed; and as black is the best absorbent of light; so the darker the iris, the better shall it perform its precluding office, and accordingly the more favourable shall be the physiognomical indication. Observations on the lower tribes stamp light coloured iris with fierceness, and dark coloured iris with mildness of the moral predaceous character; but this buoyant turbulency of light coloured iris, under the polish and refinement of education, may work the human character up to the higher finishing.

I have observed the iris become considerably blanched by mental disease, and gradually resume its dark gloss in the progress of cure. The pupil consists in a want of this iris, is bounded by it, and is diminished or increased in proportion to its contraction or dilatation. As contraction of iris depends upon sympathy with the retina, so a small pupil indicates sensibility of retina, and sensibility of retina indicates a keenness of eyesight, and of the predaceous disposition; whereas the large pupil so much in request as a component part of beauty, bespeaks mildness of the predaceous character. It may be here remarked, that the blood horse is distinguished by a red gleam deep in the pupil. This must depend upon the colour of the tapetum, which in that animal varies from a silver blue colour to a violet. Does the black pigment of the human eye ever so change colour as to produce a gleam, especially during mania?

As the lips acted to the jaws in a positive and in a negative capacity, so the eyelids act in a positive and in a negative capacity to the

eyeball. We have already seen the eyelids in concert with the lachrymal gland busily lubricating the surface of the eyeball. We have now to inquire into their secondary office, of regulating the entrance of rays into the pupil. The utility of a mere covering to this tender organ from exposure and injury, is well proved by the excruciating, and increasing, and never-ceasing misery which follows the extirpation of the eyelids, a punishment inflicted by some barbarous nations. The eyeball taken by itself is purely predaceous. Naked eyeballs standing in open sockets, convey to the imagination a picture of unbridled temper; and the less the eyeballs are covered with eyelids, just in the same way as the less the jaws were covered with lips, the more scope is allowed to the predaceous tendency. On the contrary, the more the eyeball is covered with lids, the more are the dispositions under prudential control, and the more powerful the lids, and the better furnished with lashes, the more vigorous is the prudential system. The eyelids, whenever they retreat so far from the pupil as to lose command over the entering rays, are guilty of a dereliction of duty,

detrimental to distinct vision;—here there is a want of the prudential system. So also whenever the eyelids approach each other so much as to interrupt the free admission of rays from the object to the retina;—here the prudential system is in excess;—here there is that over-caution, which defeats its own purposes. The orbicular muscle of the eyelids is not, what the name implies, and what some anatomists represent, a single muscle, but is distinctly two muscles, for the upper eyelid can act without the smallest motion of the lower, and the lower without the smallest perceptible motion of the upper. The upper is the only eyelid that is furnished with a retracting muscle, and is the real opener and shutter of the eye. Where the retraction of the upper eyelid is carried to the utmost extent, there the prudential system is thrown completely off, and desperation or rage is the result, according as the eyebrows ascend out of the way, or descend to supply the place of the eyelids. Where the upper eyelid droops, and encroaches upon the pupil without any ascent of the lower, there is melancholy. The upper eyelid seems to represent

that part of the moral character, as the lower lip was formerly found to represent that part of the animal character, which regards self. The lower eyelid is furnished with no muscle except the lower division of the orbicularis. Elevation of the upper lip and angles of the mouth generally accompanies and assists the action of this lower division of the orbicularis, in elevating the lower eyelid. This accompaniment gives a clew to the distinction of the eyelids, and makes the lower eyelid rank with the upper lip in regarding others. Elevation of the lower eyelid seems to screen the eye from discerning the object of attack, at that very time, when the upper teeth are generally unsheathed, as if the animal tendency to devour stirred up the moral tendency to restrain. Elevation of the upper lip, and of the upper eye-lid is smiling, and constitutes a part of laughter. The elevation of the upper lip, without the accompaniment of elevation of the lower eyelid, would not be a part of laughter, nor without that accompaniment would laughter ever be considered a token of mirth. It is this very rising of the lower eyelid, that converts retraction of

the upper lip, from a grin into a laugh. There is a marked contrast between the wild ghastly stare of stupor and rage, and the well shrouded-up pupil of laughter, in which not only the lower eyelid ascends, but also the upper descends. Those eyelids whose edges habitually approach each other, are seldom harassed with anxiety, or torn asunder with anguish. Such people instead of brooding over difficulties and misfortunes of their own, divert themselves, like Democritus of old, with laughing at the folly of others: while the wretch with open eye-lids is disposed to sit contemplating and computing, until the stone which he might have kicked aside with his foot, enlarges in his imagination into an impassable mountain. Where the habitual action of the orbicularis is vigorous, the inner canthus is drawn over the caruncula. Exposure of the caruncula, therefore, is of a negative nature, implies want of sufficient action of the orbicularis, is generally accompanied by an open eye and smooth eyelids, and bespeaks sincerity. On the contrary, wrinkles running along the eyelids, from side

to side, and passing out upon the temples, denotes habitual indulgence in laughter.

The primary and main office of the eyebrows is to assist in regulating the entrance of rays into the pupil, and the secondary office is to conduct away the sweat of the brow, from trickling down upon the eye. While the iris accommodates the size of the pupil, or the stream of rays, to the sensibility of the retina, and while the eyelids, by taking a larger sweep, intercept all the superfluous and straggling rays from reaching the eyeball; the eyebrow takes a general sweep over the whole, as an eyeshade preventing too great a glare of light from falling inwards upon the ocular region. Although the eyebrows are subservient to vision, yet as they stand more aloof from the pupil, and have their seat upon the vault which encloses the brain, so they must refer to the relation which the intellectual faculties, hold towards the predaceous organ. When the eyelids, sympathetic from their lubricating office, and prudential from their intercepting office, forsake the eyeball, then all sympathetic restraint, and prudential government

have forsaken the predaceous organ, and it remains with the eyebrows to determine what shall be done. If they ascend out of the way—if the whole faculties of the mind turn their back—then the wretch is abandoned to fear; but if the eyebrows, in this emergency, descend towards the pupil, and take the management of the entering rays—if the intellectual faculties take the part of the predaceous organ—then the whole man yields himself up to unbridled fury. This shows how little adequate is human wisdom of itself to regulate human conduct. As long as the eyelids duly cover the eyeball, a descent of the eyebrows merely indicates a proper combination of moral and intellectual, in the predaceous activity—of moral, in virtue of the eyelids, of intellectual, in virtue of the eyebrows.

Size and colour are qualities of eyebrows partly natural, and must therefore point to natural qualities of mind. Situation and shape may be partly acquired, and must therefore in some measure, indicate how the intellectual faculties, and the predacious tendency of the

eye have been consorting. The more bushy, and the more extensive the eyebrows, the more power have they in regulating the passage of rays into the pupil, and the more are the intellectual faculties devoted to regulate and assist the predaceous tendency. As the rays of light are more absorbed in proportion to the darkness of the colour, and as pure black is a complete absorber of all the rays of light, so the eyebrows, in proportion to their darkness, more effectually intercept the straggling or superfluous rays from entering the pupil, and are therefore more calculated for superintending and assisting the predaceous organ. Let oculists take a hint from Nature, to have their eyeshades of a black colour. Black eyebrows therefore bespeak a vigorous application of the intellectual faculties to predaceous pursuits.

What is called the occipito-frontal muscle is actually composed of no less than four muscles, two occipital and two frontal, nay, is properly composed of six; for the two naso-frontal slips, having a distinct action, are en-

titled to a distinct name. The occipital muscles, as they are inserted behind into the thin sheet of tendon which stretches over the upper part of the head, and gives attachment before to the frontal muscles, have an indirect influence upon the motions of the eyebrows; but, as we will afterwards find, belong properly to the hairy scalp, and serve, by drawing it back from overcasting the forehead, to enlarge the dimensions of the brow. The frontal muscles descend from this sheet of tendon to the eyebrows, not perpendicularly, but somewhat obliquely, the better to antagonize the corrugators. The lower ends of the frontal muscles cover the corrugators, form attachments and interlacements with them, and with the orbicular muscles of the eyelids, and are fixed to the skin and adipose substance of the eyebrows. The frontal muscles make the eyebrows and hairy scalp approach each other. If the hairy scalp be fixed back by the occipital muscles, then the eyebrows ascend; if the eyebrows be fixed by the superciliary, naso-frontal, and orbicular muscles, then the hairy scalp must descend. The frontal muscles, then, so far from forming one with the occipital, are at times

their very antagonists; but at present we have to view them only in their capacity of elevating the eyebrows. The frontal muscles, then, since they draw the eyebrows from the eye, must be considered negative.

The two muscular slips which descend from the frontal muscles to the nasal bones, draw the nasal ends of the eyebrows down upon the nose, and form a check upon the frontal muscles, and a security, that the eyebrows shall at no time be drawn out of the reach of their duty. This check is the more necessary, as the superciliary muscles oppose the frontal only obliquely. The superciliary muscles or corrugators, arise from about the junction of the nasal and frontal bones, take a sweep along the superciliary ridge to about its middle, and in passing along lay hold of the frontal muscles, and of the adipose substance and skin of the eyebrows, and have the effect of lowering the eyebrows upon the eye, of making the eyebrows approach each other, of drawing down their nasal extremities, and of corrugating the skin above the nose. The upper division of the orbicular

muscles of the eyelids draws the eyebrows down, and, by approximating their two extremities, renders them circular. All these muscles have fixed origins at the inner angle of the orbit, whence they proceed upwards and outwards to moveable insertions; they all therefore conspire to make the eyebrows both approach and surround the eyes. A perpendicular rut or wrinkle between the eyebrows, indicates a temporary contraction of the corrugators; for were the contraction permanent, the elasticity of the skin would soon efface the wrinkles. Transverse or horizontal wrinkles of the brow, on the other hand, indicate a temporary predominance of the frontal muscles. A struggling between the positive and the negative muscles of the eyebrows, produces a mixture of perpendicular and horizontal wrinkles, along with a slight elevation of the nasal extremities of the eyebrows, and gives the expression of plodding anxiety. As the main office of the eyebrows, is to exclude all unnecessary rays, to keep the pupil as much as possible confined to the one object of perception, and enclosed from the intrusion of every other, so the more the naso-frontal,

superciliary, and orbicular muscles preponderate over the frontal—the more the eyebrows are made to encircle the pupil, the more intent is the mind in its pursuit, and *vice versa.* How closely and extensively the eye is encircled with eyebrow, may be said to represent how closely and extensively the moral predaceous tendency is encircled with intellect, not with how much intellect, but how with such intellect as the individual may happen to possess.

Andrew and James Duncan,
Printers, Glasgow.

ERRATA.

Page 21, line 16, *for* chrystal, *read* crystal.
—— 51, —— 9 and 10, *for* high, *read* low.
—— 64, —— 4, *for* is, *read* are.

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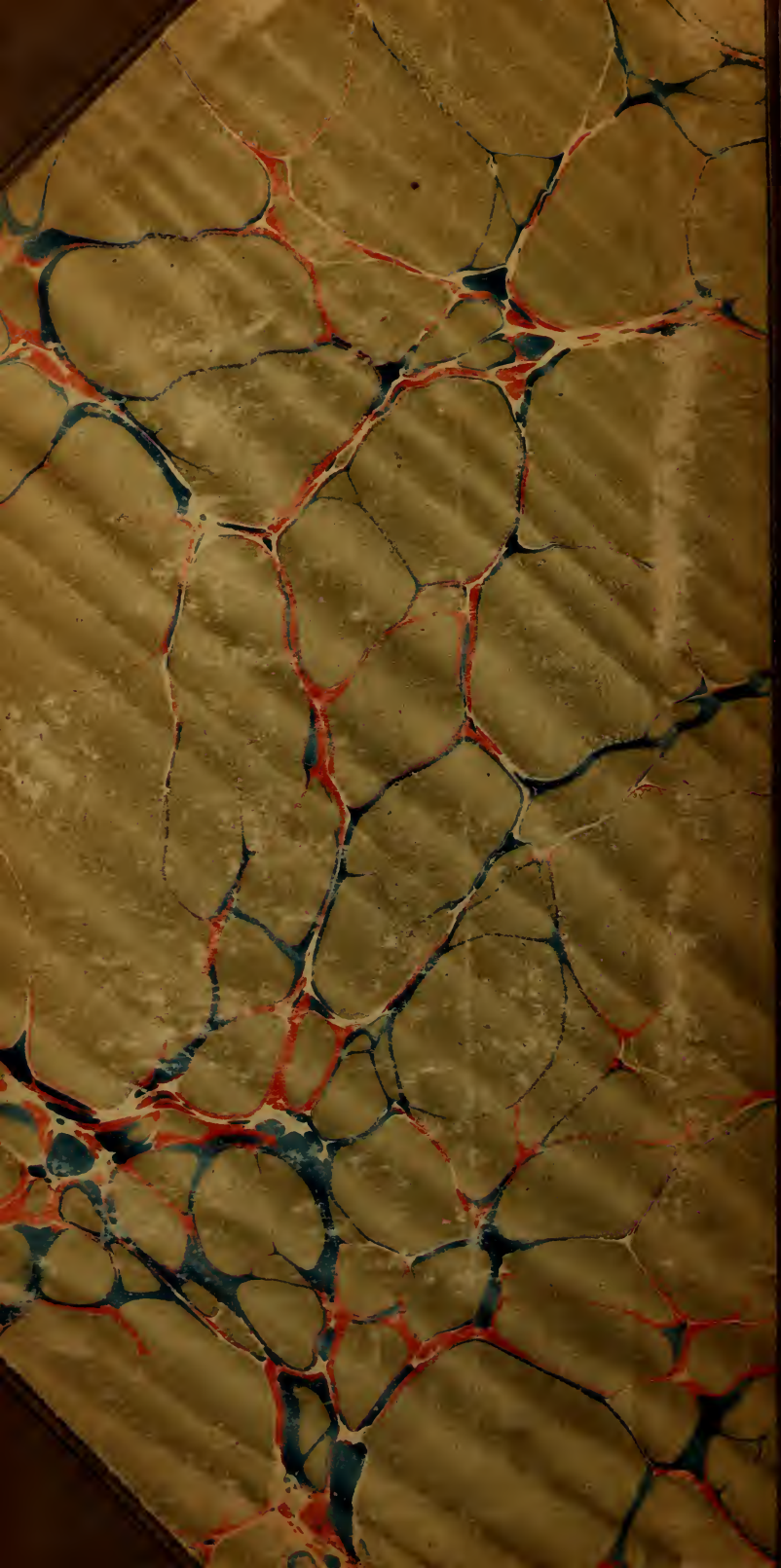
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